VOLUME XCVI NUMBER THREE

THE NATIONAL GEOGRAPHIC MAGAZINE

SEPTEMBER, 1949

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C.

$5.00 A YEAR 50c THE COPY

Vol. XCVI, No. 3 WASHINGTON September, 1949

THE NATIONAL GEOGRAPHIC MAGAZINE

Minnesota Makes Ideas Pay

By Frederick G. Vosburgh

Illustrations by National Geographic Photographers John E. Fletcher and B. Anthony Stewart

IN VERSATILE Minnesota the world's biggest milling company makes Wheaties with one hand and with the other sends balloons nearly 20 miles into the sky for data on cosmic rays.

Seen at immense heights at dusk when they reflect the sun's last rays, these big unmanned plastic balloons have been mistaken for new planets or stars. Some have descended a thousand miles from their launching point at Camp Ripley, Minnesota.

"Project Skyhook" is carried on in cooperation with the Navy by General Mills, Inc., of Minneapolis, whose research laboratory and mechanical department formed the habit of such teamwork during World War II (p. 313).

State's Future "Between the Ears . . ."

Strange link between bread or breakfast food and the mysteries of space, this project forms a dramatic example of the vision and versatility of Minnesota, which this year is celebrating the 100th anniversary of its establishment as a Territory.

"The most important industrial asset we have," said a State official with a typically Scandinavian name, "is right between the ears of our young people still in school."

Ingenious enterprises dot the State. One man gets valuable vitamins from a repulsive-looking fish; another has found a way to can carp. From Duluth each year go out a million or more little Christmas trees, tops of useless stunted bog spruce. In one prairie town a war-born firm trains young farmers as precision-instrument makers. In another a man produces "maple" syrup from corncobs.

Like many a present-day pilgrim, I first entered Minnesota by air.

Below the plane the sunny land seemed strangely full of holes—as if some super-Minnesotan had blazed away at his State with a shotgun, then filled the holes with sky.

Recreation Third Richest Enterprise

"Minnesota" to the Sioux meant "Cloudy" or "Sky-tinted Water." They applied it to the river that meanders across the State to meet the growing Mississippi, but even more aptly it applies to this whole great "Land of Ten Thousand Lakes," which really has more than 11,000.

Some names are purest poetry: Lac qui Parle—"Lake That Speaks"—and Minnetonka, "Big Water," with its sound of wavelets on a shore.

Others express the hopelessness of trying to find names enough. The State has 99 Long Lakes, and the name of 91 is Mud.

Whimsically eloquent of the problem is a string of lakes just north of the border—Thisman Lake, Thatman Lake, and Otherman Lake (map, pages 294-5).

Glacier-formed lakes and linking streams were Minnesota's first highways, paddled by Indians in bark canoes, by explorers and red-capped voyageurs.

Now on the lakes and forests thrives Minnesota's third richest enterprise, the big business of recreation. Only farming and iron ore surpass the resort business in cash importance (pages 300, 305, 317).

In late June and early July air travelers over the farming sections see other expanses

Like a Fugitive from Manhattan, 32-story Foshay Tower Dominates Minneapolis

The tapering office building, dedicated in 1929, is patterned after the Washington Monument and topped by a television transmitter. From its lofty balcony visitors get a magnificent view of the city. Tallest of the buildings at right is the 27-story Rand Tower. In the foreground traffic flows along Third Avenue. More than a third of Minnesota's 2,940,000 inhabitants live in the Twin Cities metropolitan district.

of blue—like lakes, but too square-cornered. These are blossoming fields of flax, a double-barreled cash crop.

"Lakes" of Flax Yield Oil, Paper

Minnesota grows more flax than any other State—36 percent of the country's total. Seeds produce linseed oil for paint, linoleum, and the ink that prints these words; oil cake makes dairy feed; and since early in World War II most of the country's cigarette paper has come from Minnesota seed-flax straw.

Except for a tiny percentage used for rugs, insulation, cord, and stuffing for furniture, virtually all of this straw formerly was burned in the fields. Along the roads now are stacks as big as houses, waiting to be hauled off to such plants as one at Winsdom, "the Flax Capital."

Here is a factory that needs no fuel; its boilers burn waste from the straw itself. The outer fiber, a tangled blond tow, goes to cigarette-paper factories in East and South, replacing linen rags imported from Europe till war cut off the supply.*

Though there's many a slip between a laboratory and commercial use, scientists at the University of Minnesota have found that this seedy relative of the fiber flax grown for linen—chiefly abroad—can be made into linen, too.

Corn-husking Champion Now Uses Machine

With prices good, most farmers lack little that their neighbors in city and town enjoy. Sixty-nine percent of the farms have electricity. Many use bottled gas, a by-product of high-octane gasoline plants in the South.

On one of Minnesota's 188,952 farms I met Ted Balko, twice winner of the national corn-husking championship in the 1930's.

* See "Dixie Spins the Wheel of Industry," by William H. Nicholas, NATIONAL GEOGRAPHIC MAGAZINE, March, 1949.

Prosperity's Four Horses, Prancing Toward the St. Paul Skyline, Get a Scrubbing

Workmen refurbish the golden quadriga at the base of the Minnesota State capitol dome (page 310). Holding high a standard and bearing a cornucopia, Prosperity rides a triumphal cart which seems about to soar out over the serried downtown section and Mississippi River water front of the busy capital city. The statuary group was executed by Daniel Chester French and Edward Potter.

"How long since you husked corn by hand?" I asked.

"I haven't husked an ear in years," he said. "I've got a mechanical corn picker."

He milks by electricity and keeps no bull; his calves are sired by a syringe. One local veterinarian artificially inseminates 2,000 cows a year.

Many fields are in sugar beets or soybeans, the latter a product that has risen to major importance in the State in the last half-dozen years. Minnesota has jumped to sixth place among the States in production of this Asiatic legume, used for shortening, margarine, flour, meal, plastics, and the new foam fire-fighting material. In wheat it stands only 17th (page 334).

Diversified farming is now the rule. Minnesota ranks second to Iowa in oats, fourth in corn, barley, and hay.

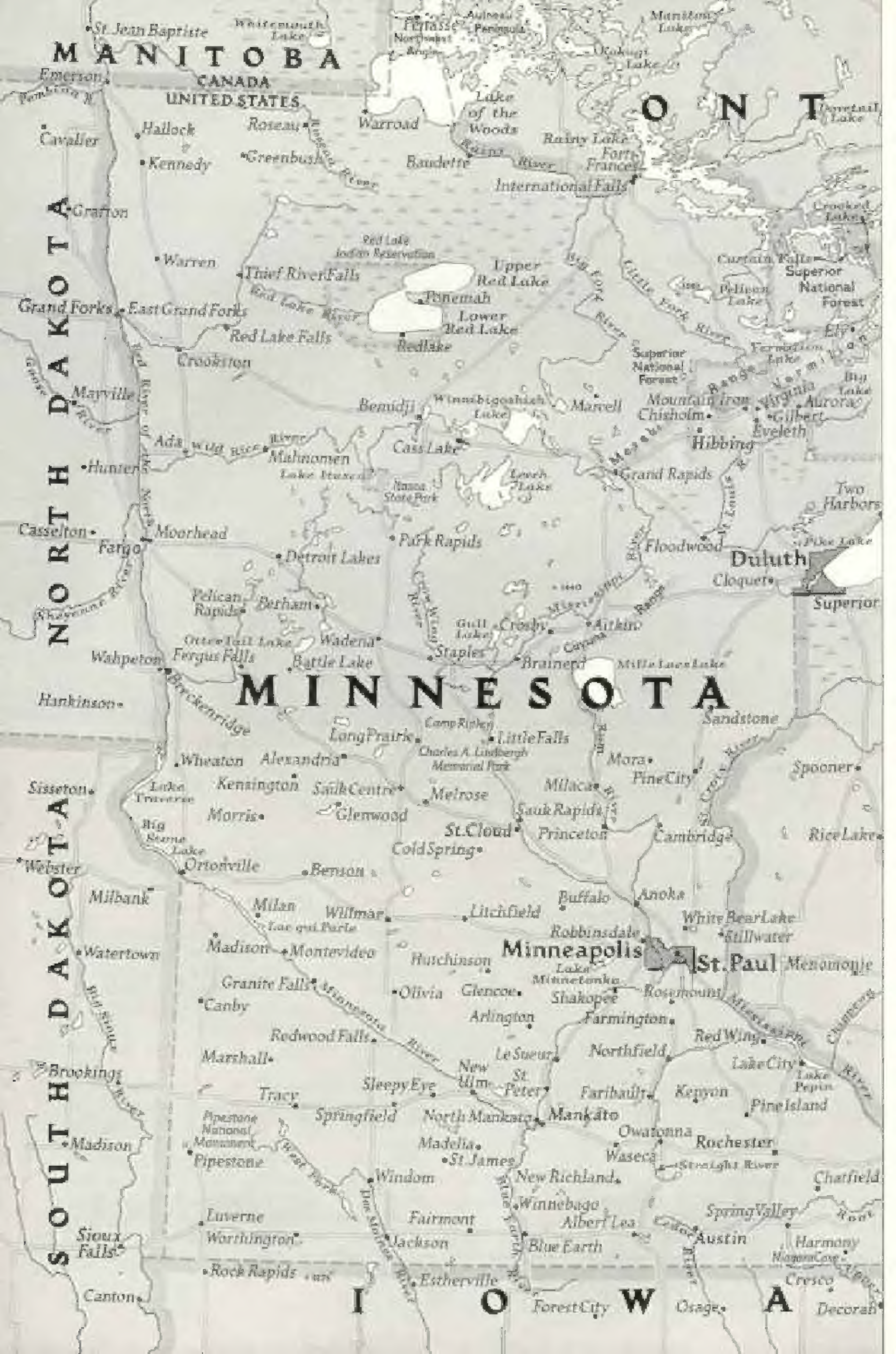
When I chatted with a farmer on the street in St. James and asked him what he raised, he replied with an impish grin. "Oh, corn, beans, cowbirds, and a little hell."

Mesabi, Iron Giant in the Earth

As we flew over the iron country north and northwest of Duluth, great red holes gaped in low-swelling green hills, and even encroached on streets of towns, for mines not exhausted are constantly growing. We even saw a mine in the middle of a lake—dramatic evidence of what man will do to get the stuff for steel (page 309).

Down through the woods crawled rusty-hued caterpillars, ore trains bound for the docks at Duluth. Up puffed long strings of empties.

On a day of destiny for Minnesota and the Nation, November 16, 1890, a test pit was dug by J. A. Nichols, of Duluth, near a point where wagon wheels had sunk through pine needles into powdery reddish "dirt." It yielded hematite, in this case 64 percent iron.


MANITOBA
CANADA
UNITED STATES
ONT
NORTH DAKOTA
SOUTH DAKOTA
MINNESOTA
IOWA
St. Jean Baptiste
Emerson
Cavalier
Hallock
Kennedy
Roseau
Warroad
Lake of the Woods
Rainy Lake
Fort Frances
International Falls
Baudette
Grafton
Warren
Thief River Falls
Red Lake Indian Reservation
Upper Red Lake
Ponemah
Lower Red Lake
Redlake
Grand Forks
East Grand Forks
Red Lake Falls
Crookston
Mayville
Bemidji
Winnibigoshish Lake
Marvell
Mountain Iron
Chisholm
Hibbing
Gilbert
Eveleth
Aurora
Ely
Ada
Mahnomen
Cass Lake
Hunter
Grand Rapids
Two Harbors
Casselton
Fargo
Moorhead
Park Rapids
Floodwood
Duluth
Detroit Lakes
Cloquet
Superior
Pelican Rapids
Perham
Crosby
Aitkin
Wadena
Otter Tail Lake
Fergus Falls
Wahpeton
Battle Lake
Staples
Brainerd
Hankinson
Sandstone
Long Prairie
Little Falls
Wheaton
Alexandria
Mora
Pine City
Spooner
Sisseton
Kensington
Sauk Centre
Melrose
Milaca
Morris
Glenwood
Sauk Rapids
St. Cloud
Princeton
Cambridge
Rice Lake
Webster
Ortonville
Benson
Cold Spring
Milbank
Milan
Willmar
Litchfield
Buffalo
Anoka
White Bear Lake
Stillwater
Watertown
Madison
Montevideo
Hutchinson
Minneapolis
St. Paul
Menomonie
Granite Falls
Olivia
Glencoe
Shakopee
Rosemount
Canby
Arlington
Farmington
Redwood Falls
Red Wing
Marshall
Le Sueur
Northfield
Lake City
Brookings
New Ulm
St. Peter
Sleepy Eye
Faribault
Kenyon
Pine Island
Tracy
Springfield
North Mankato
Mankato
Pipestone National Monument
Owatonna
Madelia
Rochester
Pipestone
St. James
Waseca
Windom
New Richland
Chatfield
Luverne
Fairmont
Winnebago
Albert Lea
Spring Valley
Worthington
Jackson
Blue Earth
Austin
Harmony
Sioux Falls
Rock Rapids
Estherville
Cresco
Canton
Forest City
Osage
Decorah

The discovery, just north of the present Mountain Iron Mine, marked the end of 20 years of hunting by the Merritt brothers, Nichols' employers, whose father had told his seven sons, "I tell you there's iron up there worth more than all the gold in California!"

Iron had been struck on the Vermilion Range as early as 1865, but required underground mining. Here all that was needed was to shovel it up. Mesabi, spelled variously, is an Indian name for a legendary giant believed to lie buried in these hills.

Minnesota's third iron range, the Cuyuna, gets its name from a man and his four-legged friend. Its discoverer in 1904, a surveyor named Cuyler Adams, linked part of his name with that of his dog, Una. Cuyuna it became.

From all three ranges ore trickled, then poured, hitting a high of 75,240,496 tons in 1942 in response to World War II demands.

Coming down to the pale-blue icy waters of Lake Superior at Duluth, I saw the ore shot into long, dachshund-shaped boats by a broadside of roaring chutes (p. 320). From Duluth and Two Harbors, Minnesota, and from Superior, Wisconsin, the ore starts across the Great Lakes toward the glowing steel mills of Pennsylvania, Ohio, Indiana, Illinois.

Now two world wars and our living scale have taken great toll. Some mining engineers say that at the present rate the easy-to-scoop-up open-pit ore may be gone in 20 to 35 years. Extensive indications of iron west and southwest of the present ranges were detected by airborne magnetometers of flying geologists of the United States and Minnesota Geological Surveys last year. But the experts say there is little hope that any of this iron lies near enough to the surface to be tapped by open pits.

Getting Iron from Gray Rock

Conservation-conscious, the State is working with enlightened industry on the making of high-grade iron concentrate from the billions of tons of gray rock called taconite, and production of high-purity iron powder from the darker rock called carbonate slate. Both have been ignored

Drawn by Harry E. Ollman and Irvin E. Albosta

Minnesota Has Its Feet in Warm, Corn-growing Plains, Its Head in Lake-strewn Wilderness

Larger than some European countries, the 84,068-square-mile North Star State produces immense quantities of food, chiefly on farms in its southern half and in the valley of the Red River of the North. Most of the Nation's iron ore comes from the ranges near Duluth, also a key to the lake and forest country that makes this a famed vacation State.

If Misery Loves Company, This Should Be Ideal—150 Dentist Chairs in One Big Room

Actually, there's a minimum of pain, for the most up-to-date methods are used at this huge clinic of the University of Minnesota's School of Dentistry at Minneapolis (page 315). Under supervision of well-qualified dentists, juniors and seniors gain practical experience here. Patients pay only the cost of materials.

or tossed aside in mining rich magnetite and hematite.

Here is an experiment in which every American has a financial stake. Every time you pick up a needle, open a "tin" can, fire a gun, or drive a car, more likely than not you are using Minnesota iron. Seventy percent of the iron used in the country comes from here.*

Iron ore even richer than Nature's product can be made from taconite, a rock which is 20 to 35 percent iron and so abundant here it would meet the Nation's needs for centuries.

At the University of Minnesota's Mines Experiment Station, long-visioned, persistent Dr. E. W. Davis last year made the first pig iron from Minnesota taconite. There he showed me how iron from the magnetic form of the rock is concentrated.

Broken and pulverized, the taconite is passed under magnets which pull out the tiny dark bits of iron. When packed into pellets like black marbles, this concentrate is ready for the blast furnaces. Its iron content is about 65 percent compared to 50 to 55 percent for the nature-made open-pit ore.

Up in the iron country private industry is trying this and other ways of getting iron from rock.

Machine Parts from Powdered Iron

Even more interesting is the attack on the carbonate slate, 24 percent iron. By a chemical method developed by the late C. V. Firth at the University of Minnesota, this abundant rock can be made to yield powdered iron of 98 or 99 percent purity.

Near Aurora, where the red-pitted Mesabi Range meets the vast northern wilderness area, a plant was erected last year with the funds and cooperation of the State to turn

* See "Steel: Master of Them All," by Albert W. Atwood, NATIONAL GEOGRAPHIC MAGAZINE, April, 1947.

out tons of this powder. The dark-gray pulverized rock is "digested" in sulphuric acid, which transforms the iron to greenish crystals of copperas, or ferrous sulphate. A series of processes turns this into red iron oxide, then metallic iron, which is ground into powder.

At the University I watched J. D. Parrish, a young associate of Dr. Davis, pour some of the pepperlike powder into a hydraulic press. The proper quantity flowed into a die. When he turned on the power, the powder was gripped with a pressure of ten tons to the square inch. Then out popped what looked like a piece of steel.

Gears or other machine parts made of this compacted powder will keep popping out as long as the press is turned on and the powder lasts.

When I picked up one, I found it warm. When I bent it hard, it broke.

"That's because it hasn't been sintered yet," Mr. Parrish explained as he put the parts into an electric furnace. When they emerged and cooled, Paul Bunyan himself could not have broken them. Articles made from this powdered iron have a strength between that of cast iron and steel.

Hitherto, iron powder has come largely from steel-mill waste. If Minnesotans can produce it cheaply from rock, they hope many more articles can be made from powdered iron—and right here in the State. This kind of iron would never have to be shipped east and melted. Out of something ignored till now, an industry would be born.

When Greyhound Was a Pup

Hibbing, on the Mesabi Range, cradled the great Greyhound system of motorbus transportation which now crisscrosses the Nation with big aluminum "airliners on wheels." Last year its buses covered 500,111,935 miles, about 20,000 times the circumference of the earth.

Father, or at least godfather, of the industry is unassuming, genial Andrew G. Anderson, "Bus Andy" to everybody in Hibbing. A teen-age immigrant from Sweden, he worked in the mines; then, in April, 1914, he and a friend bought a new Hupmobile and tried to sell cars. Townspeople clamored for demonstration rides but didn't buy.

"Andrew," suggested a fatherly Swede, "why not charge for the rides you give and run regular trips?"

"I started next day," Andy related to me, recalling that the town was already moving to make way for what is now the world's largest open-pit iron mine (pages 318-319). Between Hibbing and the mine stretched two and a half miles of red mud through which pedestrians plodded. They gladly piled aboard the jitney—as many as 19 in and on it.

After a month Charlie Wenberg, Andy's partner, sold his half-interest in the Hup to C. E. Wickman, of Hibbing, the dealer from whom they had bought it. Mr. Wickman is now Chairman of the Board of the Greyhound Corporation. He and Andy shared the driving—and the rising profits, which soon enabled their Mesaba Transportation Company to buy primitive buses and take on longer lines.

Branching out, Mr. Wickman formed the Northland Transportation Company, which became the nucleus of the Greyhound Corporation in 1926. Teamed with him in the swift development of the system was Orville S. Caesar, now Greyhound's President.

Greyhound got its name in Fond du Lac, Wisconsin, when a bus-line manager from Hibbing saw a reflection of a new bus in a store window. Its sleek lines reminded him of a racing greyhound.

Many of the early drivers at Hibbing became Greyhound executives. And what of Bus Andy? He's still in Hibbing. He has interests in lines in three other cities, but his darling is still his first love, the old Mesaba Transportation Company.

Rail and air transportation, too, owe much to Minnesota. James J. Hill, of St. Paul, built up the Great Northern Railway Company, which opened the whole Northwest. Great Northern and Northern Pacific still have their headquarters in St. Paul, and the Soo Line in Minneapolis. Now Northwest Airlines, of St. Paul, spans the continent and flies to the Orient.

22 Lakes in Minneapolis Park System

In a plane of Minnesota-born Northwest Airlines I glided down to Wold-Chamberlain Field at the Twin Cities, home of about a third of the State's nearly three million people.

Besides the grain elevators—studies in curves—what impressed me most as I rode to downtown Minneapolis was the number and beauty of the lakes and parks (inset, map, pages 294-5). Minneapolis is a city decked in gems, with 22 lakes within its park system.

In Minnehaha Park in the midst of the city I saw two wild ring-necked pheasants strolling as if aware that here was sanctuary.

Rivalry between the metropolis and smaller, older St. Paul, the capital, is real if largely humorous and verbal. Actually it is hard to tell where one city ends and the other begins—except by the fact that you pay another fare on bus, streetcar, or taxi.

Downtown St. Paul has narrower streets. Its air of age and conservatism and the number of people with Irish names are faintly suggestive of Boston. Big homes of bygone lumber barons and of modern millionaires lend a Back Bay opulence to such impressive thoroughfares as Summit Avenue.

Sprawling Minneapolis, like Washington, D. C., is a city of magnificent distances. Washington Monument-shaped Foshay Tower dominates the business district (page 292).

Names of main Minneapolis streets recall the State's early French explorers. To me, Hennepin Avenue seems the city's equivalent of New York's Broadway, while Nicollet, with its handsome stores, suggests Fifth Avenue.

Here, as elsewhere in Minnesota, people seem unusually tall and healthy; the women wear the "new look" well. Blond hair and blue eyes are not standard equipment, but you see them uncommonly often, and the number of Scandinavian names is eloquent of the part northern Europe has played in building the State. Blond, energetic Governor Luther Youngdahl is a scion of pioneer Swedes.

Olsons Outnumber the Smiths

In the Minneapolis telephone book the Johnsons outnumber the Joneses more than ten to one (4,059 names to 392). The Olsons far outstrip the Smiths (1,646 names to 1,080), not counting the Olsens, Olesens, and seven other similar spellings. Twenty-eight inches of columns are devoted to names beginning with the Scandinavian "Bj," most numerous of which are the Bjorklunds.

Of the four big newspapers here, the oldest is the morning *St. Paul Pioneer Press*, which stems from the *Minnesota Pioneer*, first published just 100 years ago. This and the evening *St. Paul Dispatch* are run by the Ridder family of St. Paul.

The newspapers of greatest circulation in the upper midwest area are the *Minneapolis Star* and *Tribune*, which completed in 1949 one of the largest and most modern newspaper plants in the Nation. They are published by John and Gardner Cowles, originally from Iowa. Best known member of their able staffs is Cedric Adams, whose newsy, folksy column is as much a part of most readers' day as dinner.

From headquarters in Minneapolis, the Sister Kenny Institute combats the crippling effects of infantile paralysis.

It struck me as typical of Minnesota that when I called at the capitol in St. Paul I was calmly handed the keys! I wanted a close look at the gilded horses eternally galloping at the base of the dome (pages 293, 310).

"Go right on up, sir," said the busy young man on duty in the lobby. "These will unlock the doors."

The shadow of this capitol often falls across the national scene. Republican Harold Stassen, former Governor, and the new Democratic Senator, Hubert Humphrey, former mayor of Minneapolis, stand high in national councils despite their comparative youth, 42 and 38 years, respectively.

Alert to make the most of existing resources and to develop new enterprises, Minnesota has established State commissions which encourage private initiative.

White collars and iron ore seem an odd combination, but State and local cooperation with industry recently aided in establishing shirt and underwear factories on the Mesabi Range. Housed in handsome municipal buildings, these plants at Eveleth, Virginia, Gilbert, and Chisholm are run by Cluett, Peabody & Co., Inc., of Troy, New York, and employ 1,100, mostly women. Their earnings—some two million dollars a year—boom local business and help avoid too great dependence upon mining, much of which is seasonal.

The same State agency is pushing the iron powder project (page 296), and also is trying to work out ways of using the peat that abounds in the bogs of the north. A new plant at Floodwood now ships out carloads of peat moss for gardens, chiefly to the West Coast.

"Peat for Heat" Project

"If any of my readers wish they were rich," wrote a Minnesotan, Glanville Smith, 14 years ago in the NATIONAL GEOGRAPHIC, "let them busy themselves in solving the problem of how to use Minnesota's high-grade peat in smelting her lower-grade iron ores." *

At Chisholm, on the Mesabi Range, the State's "peat for heat" project has experimentally produced 89 percent iron by reducing low-grade ore with peat.

Some State officials think the day is near when peat for producing steam to make electricity will replace many tons of coal now brought hundreds of miles from the east; Russia, they point out, uses quantities of peat for industrial fuel. Others believe the big future of peat lies in its derivatives, including fuel oil, gasoline, tars, waxes, and dye chemicals.

An even bigger attack on the fuel problem is being made jointly by Minnesota, its next-door neighbor North Dakota, and the Federal Government at Grand Forks, North

* See "Minnesota, Mother of Lakes and Rivers," NATIONAL GEOGRAPHIC MAGAZINE, March, 1935.

Bodmer photo to John E. Fletcher

Paul Bunyan Puffs His Foot-long Pipe in the State Capitol, but His Day Is Done

Conservation has come in the wake of the mythical giant lumberjack who logged whole townships at a time, uprooted trees to comb his beard, and had his camp griddle greased by boys using sides of bacon as skates!

Deep in the Quetico-Superior Wilderness, Canoeists Launch Their Craft on Crooked Lake, as Pictured Along Annual Curtain Falls

At a Summer Folk-dance Festival, Dancers Whirl in a Swedish *Hambo* Beside Lake Superior at Duluth

A Half a Dozen Hops Carry Them Across the Mississippi River

Nimble-footed Logrollers Compete at Stillwater on the St. Croix

This Sentinel Is Especially Needed Because Iron in the Rocks Makes Compasses Erratic

All Minneapolis Turns Out for the Aquatennial Parade—Miles of Resplendent Floats, Bands, Marchers and Pulchritude

[illegible]

Eight Black Bass and a Minnesota Muskie Record Encounter at Marcell, Itasca County, a Hundred Miles Northwest of Duluth

Millions of Little Painted Christmas Trees Hold Toys Picture-window Decor

[illegible]

At St. Paul's International Institute, New Americans Learn American Ways as the Teacher Explains Government 101, By and For the People

Boom of Logs To Feed Huge Mills of a Large Paper Company Floats Like Giant Pile Poles Over the Air

Near Aurora, Minnesota, Texas Tips Iron Mine on the Mesabi and a Lake. Stable Hoists Measures Show the Open-pit Ore Is Running Low

Progressive Ideas Stem from Minnesota's Marble-domed Capitol in St. Paul

[illegible] the state's Prosperity [illegible] a municipal [illegible]

Exotic Furs, Feathers For Turning Fresh

[illegible]

Mermaiser's Loveliest Group Its Queens

[illegible]

Through Seas of Grain in the Red River Valley Plow Whole Fleets of Combines

[illegible] farm near Fargo, N. Dak., grows 15,000 acres of wheat, barley, and flax, and a thousand acres of certified seed potatoes

Laboratories Constantly Test the Products of This Great Bread-and-Butter Stars

Queen Shirley at the 1985 Miss Minneapolis Beauty Pageant, the Grand Minnesota Name at Peterson

[illegible] tive is to use the [illegible] in the Dakotas and Montana—nearly a thousand billion tons, geologists say.

Hardboard and even molasses from aspens, "weed tree" of the Minnesota northlands, and acetic acid from sulphurous iron ore; mushrooms raised in peat compost; seed potatoes and rutabagas that thrive in the north—these are some of the projects hatched for the northeastern part of the State.

Pioneers in Fluorine for Saving Teeth

From the capitol I went to the University of Minnesota, high above the Mississippi in Minneapolis, where I saw a small boy's nightmare—150 dentists' chairs row on row in one dang room (page 246).

The University's School of Dentistry most helped discover the value of sodium fluoride in preventing tooth decay.

Eleven years ago Dr. Wallace D. Armstrong here noted considerable fluorine on extracted teeth free of cavities. On decayed teeth he found much less.

At about the same time the United States Public Health Service discovered that in localities that had much fluorine in their water the rate of tooth decay was only about half of normal.

These two discoveries touched off research all over the United States. Dr. John W. Knutson of the Public Health Service, a graduate of the dental school, joined forces with Dr. Armstrong, and their studies in North Mankato, Arlington, St. Louis Park, and Rochester, Minnesota, in 1940-43, showed that in children's teeth decay could be reduced about 40 percent by painting fluorine on the teeth. This is now being widely done.

In another University laboratory I saw some 30,000 of the country's most distinguished mice. Inbred for 80 generations, equivalent to about 2,500 years for humans, all members of each strain seem as much alike as identical twins. They were bred for accurate cancer research and form the living equivalent of pure, standardized chemicals.

Youthful looking Dr. John J. Bittner, Director of the University's Division of Cancer Biology, works on causes, not cures.

Various departments cooperate closely, and Dr. M. B. Visscher, head of the Department of Physiology, found that by rigid, almost starvation diet, he could cut the disease in a cancerous strain of mice from 72 percent to zero. These cancer-free little creatures were about half the weight of normal mice, were unusually active and lived longer. There was just one trouble—they were sterile!

Thus many attacks on this dread disease run into stone walls or blind alleys. Minnesota, training people for cancer research, gives a Ph. D. degree in Cancer Biology. It also is doing important work on polio and undulant fever.

Why Junior Gets Hurt

Research in this great State University of 27,243 students covers a wide range of subjects.

For instance, did you ever wonder why Junior is forever getting hurt and little Willie down the street always seems to keep out of harm's way? Dr. Elizabeth Mechem Fuller, of the University's Institute of Child Welfare, has found that some children are "accident-prone." The ones that get hurt the most are the strong, courageous, high-strung, impulsive, assertive, confident, active types.

So parents, while patching up Junior or Jane, can console themselves that at least the youngster has some of the qualities it seems to take to get on in the world.

The University's new Rosemount Research Center, 20 miles from Minneapolis on the 8,000-acre site of the Government's wartime Gopher Ordnance Plant, is 40 times the size of the campus.

Here blows a 5,000-mile-an-hour wind, in a new experimental wind tunnel utilizing air compressors for ammonia oxidation tanks that were used in making gunpowder. High pressure is created on one side and a near-vacuum on the other, so that when a quick-release valve is thrown open the air screams through at a rate nearly seven times the speed of its own sound.

Shock waves around a model rocket or a plane, or a bullet fired into the blast, can be photographed with a flash camera that shoots five pictures in 250 microseconds (millionths of a second).

Scientific Tinkering Gets Results

Private industries, too, emphasize research. Last year St. Paul's Minnesota Mining & Manufacturing Company put five cents of every sales dollar into research and engineering.

One result is Scotchlite reflective material, best known in those signs that light up at night when headlights hit them. Thousands of tiny glass spheres—30,000 to the square inch—catch and reflect the light. Strips of cloth, similarly treated and attached to clothing, make shadowy pedestrians quickly visible to motorists after dark.

By this invention, signs can be made to tell different stories by night and by day. I saw

one that read "60 miles an hour" in daylight and "50 miles an hour" when hit by headlights at night.

A better-known product of "3M" consists of its widely used tapes, named "Scotch" because an early user complained that the company was "too Scotch" with adhesive. At that time the "stickum" was applied only to part of the surface.

From Heat Controls to Autopilots

From a simple device to shut off or turn on a furnace, based on the fact that metals ex- [illegible] the Minneapolis-Honeywell Regulator Company has grown until now it makes more than 7,000 kinds of controls.

These devices are automatic, they make the push button antiquated. They regulate furnaces, operate juke boxes, turn eggs in incubators, make cows give more and richer milk by keeping their water warm in winter, help make steel and cure tobacco, warn train crews of hot boxes, prevent explosions in operating rooms, shut skunks out of chicken houses.

One glassed-in room reminded me of a maternity ward where babies are held up for new papas to see but not to touch.

"Sorry, that's one place we can't go in," my guide said. "They're assembling gyroscopes for autopilots for the Air Force."

This more-than-human device, switched on to "hold her straight and level" during the bombing run, was credited by the Air Force with greatly increasing wartime bombing accuracy.

One speck of dust in this mechanism could cause a terrible bombing error, so cleanliness is stressed here even more than in most food plants. All workers wear freshly laundered smocks. Air is precleaned by electricity and is under pressure so that when a door has to be opened the air goes out, not in.

Some 1,743 manufacturing firms in the Twin Cities turn out products ranging from linseed oil to lawbooks, from warm winter clothing to artificial limbs—made in a plant where 90 percent of the employees wear artificial legs, arms, or braces. Minneapolis-Moline, maker of farm machinery, has 204 father-son combinations on its payroll.

Food, however, is the chief product, notably flour from the Minneapolis mills where 41,650 sacks of flour a day are turned out by General Mills, Pillsbury, Russell-Miller, Commander-Larabee, International, and others (page 334); 60 tons of butter daily from the Minneapolis plant of Land O' Lakes, a huge cooperative (page 313); and meat from the South St. Paul stockyards, through which parade some 4,300,000 animals a year.

Some firms here are widely known for their novel advertising. One is the Toni Company, of St. Paul, which continually asks, "Which twin has the Toni [illegible]." Burma-Shave, in a Minneapolis park, whence come those familiar roadside jingles on red or yellow signs (page 324).

Built entirely on advertising is the big St. Paul firm of Brown & Bigelow, whose calendars and 800 other "remembrance advertising" specialties greet you in every State and many foreign countries.

Gamble-Skogmo, Inc., of Minneapolis, has revolutionized the country store all over the Middle West and West by bringing modern department store methods to Main Street.

Bert Gamble and Phil Skogmo began their partnership with an automobile agency at Fergus Falls, Minnesota, in 1920. Today they have 2,316 stores and authorized dealers. Customers are largely folk from small towns and farms, and in Bert Gamble's home town of Hunter, North Dakota (population 414), the store does a business of $300,000 a year.

"If Macy's will stay out of Hunter, North Dakota," he quips, "Gamble's will stay out of New York."

Refuge from Heat Is Always Near

Prairie heat had enfolded the Twin Cities so I headed for the cool lake country to the north. Up to my neck in Gull Lake at Grand View Lodge, near Brainerd, I forgot I had ever been hot.

On a tiny rock island gulls and terns were hatching—little gray fuzz balls almost matching the gravel. As I watched from a boat despite screams overhead, an egg palpitated and a small opening signaled a coming-out party.

"The big birds dived at us, almost hit us," excitedly reported a honeymoon couple.

In a grove on shore I saw two flickers doing a courtship dance on a level branch. Rhythmically they bowed to each other, displaying the golden lining of their wings to the accompaniment of impassioned squeaks. Like everyone here they seemed to find it good to be alive.

Soon I had to take time out to go to a fiesta of all things, in Minnesota!

"Montevideo's having its annual fiesta," announced Dick Sackett, Deputy Director of the State's Territorial Centennial.

With Dick and Larry Nelson, his associate, I traveled to the southwest part of the State to see Minnesotans acting like Uruguayans. Because the town has the same name as the

Dusk on a Minnesota Lake—Limpid Water and the Haunting Call of a Loon

[illegible] Dusk on Pike Lake near [illegible] Forest [illegible] who used [illegible]

[illegible] a [illegible] "day" or [illegible] the [illegible] Day at St [illegible] codfish soaked in lye and boiled; the Lefse Fete at Hills Milan in honor of another Scandinavian food, a thin part-potato pancake.

Often these fetes honor a particular local product—Milk Day at Farmington, Dairy [illegible] at New Richland, butter at Sauk Centre and Owatonna, cheese at Pine Island, the turkey at Worthington and [illegible] at New Brighton, clover at Albert Lea, at [illegible] King Corn is honored in many towns.

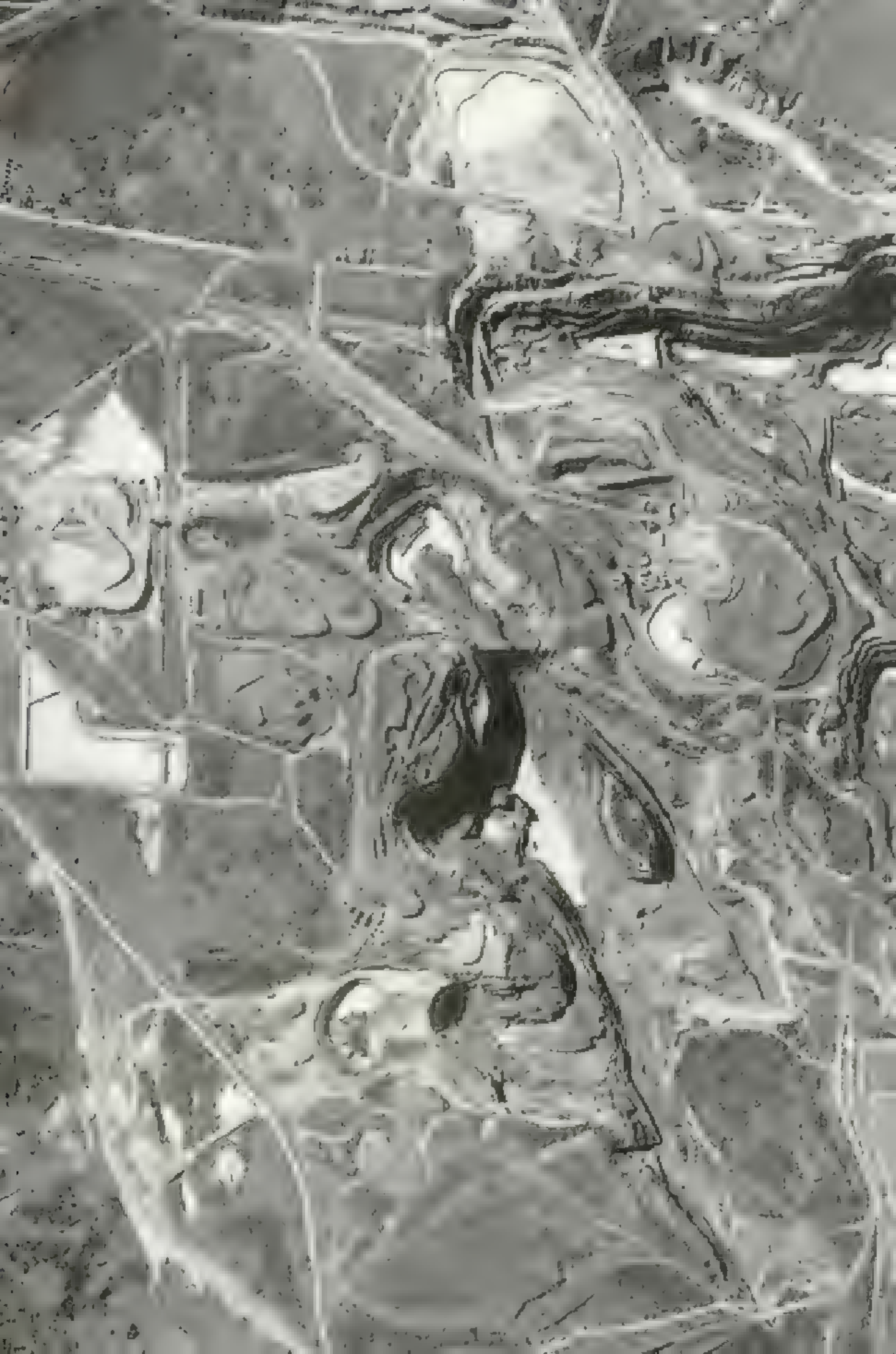
Such festivities reach their culmination in the Aquatennial in Minneapolis in summer and

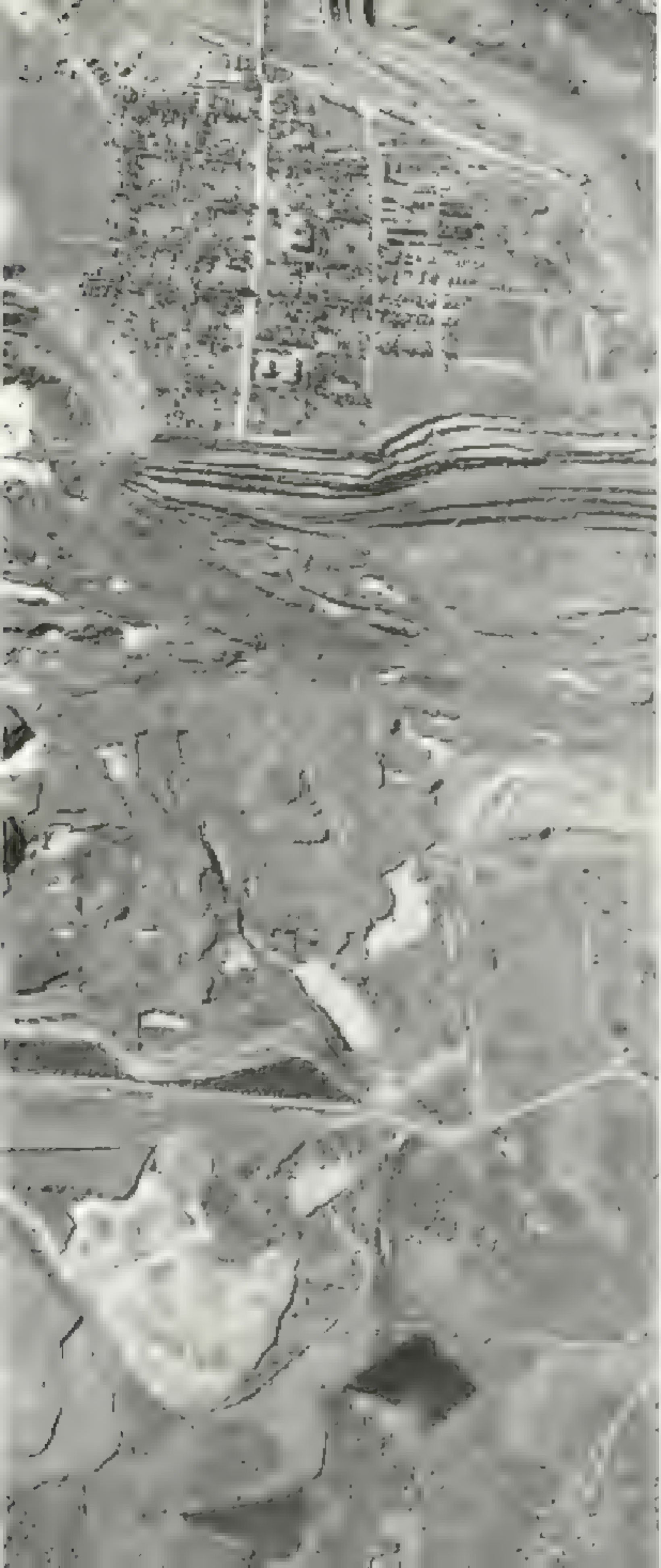
in a gesture of international friendship.

Scandinavian Seniors with Sideburns

[illegible] of these adornments were blond and worn by men named Larson, Johnson, [illegible] Their small, [illegible] women who were fetching in colorful peasant costumes of Scandinavian attire. High light was the crowning of a queen, complete with [illegible] mantilla (page 31).

This crowning of [illegible] Minnesota custom practiced by almost every town. Usually





At Hibbing the World's Largest Open-pit Iron Mine Engulfs More and More of the Town

[illegible] encroaching excavations [illegible] North Hibbing (upper [illegible] of which has [illegible] been bought and small wood [illegible] frame houses near the [illegible] are boarded up and [illegible] to make way for the steam [illegible]

[illegible] from high in the air can [illegible] magnitude of the Hull Rust Mahoning Mine be fully appreciated. Not even this photograph [illegible] [illegible] two and a half [illegible] of the mesh [illegible] material has been moved [illegible] than was originally expected [illegible] building the Panama Canal [illegible] to half a billion tons [illegible] have been hauled out on the [illegible] miles of railroad track [illegible] out this one, three and half million tons of waste has to be removed.

[illegible] the mighty [illegible] higher than the height of [illegible] dome in Washington [illegible]

[illegible] output can be [illegible] gainful employ by putting [illegible] shovels to work. The Hibbing mine, on the Mesabi Range [illegible] operated by the Oliver Iron Mining Company, a subsidiary of the [illegible] Steel Corporation.

The Suckling Pipeline Transports Bauxite Nozzle Up to the Loading Docks at Darwin

[illegible]

the Winter Carnival in St. Paul. Hither come queens from all about, bent on being the queen of queens (pages 304, 311, 325). Incidentally, BeBe Shopp, Minnesota beauty, won the title of Miss America at Atlantic City last year.

Small Wooden Houses over Indian Graves

Heading for the cool north again, photographer Jack Fletcher and I invaded Indian country on the shores of Red Lake. As guide on our trip through the reservation we enlisted a half-white boy with pure Indian features and hair.

"Do they show many wild West movies here?" I asked.

"Yes," he said with a sad little grin. "I'm usually pulling for the Indians instead of the cowboys. But we always get beat in the end."

Hesitantly he agreed to go with us up a little-traveled trail along which are graves topped by small wooden houses about the size of kennels. Here Chippewa who have not accepted the white man's god still bury their dead with ancient Indian rites.

Near the end of this road is a town called Ponemah. Long ago the insistent white men urged the Indians to have a school. "Ponemah," the Indians replied, meaning "Later on," "Some other time," "Manana." The term, slightly altered, became the place name.

Later, in winter, I flew over the reservation in a little Conservation Department plane—and found myself suddenly in a reserved seat for a moose hunt.

Near the lake we saw a cow moose and calf duck against the snow over which they were paddling. Then, about three miles away, we spied two figures on the trail, like bloodhounds—Indians with guns.

A couple of miles farther on we signaled the father of this moose family, a magnificent bull at bay. An Indian two hundred yards away maneuvered for a shot.

Under the law Indians can hunt anything at any time on their own reservations. Usually they need any meat they can get.

Most of the 17,195 Chippewa live on reservations in the northern woods and lake country. The 993 Sioux are in the southwestern section where Pipestone National Monument reserves their ancient source of the red stone out of which ceremonial pipes are still made.

Such towns as Bemidji and Sleepy Eye get their names from Indian chiefs. Battle Lake, in the resort country of Otter Tail County, commemorates the last battle between Chippewa and Sioux, a "naval" engagement between braves in war canoes.

Headed by the scenic North Shore Drive from Duluth along the greatest of the Great Lakes, Grand Portage with its Chippewa reservation stands at the point of the Arrowhead Country, Minnesota's great wedge-shaped wilderness area.

Lonely Grand Portage was once the front door to Minnesota. Here the French fur traders entered the State, carrying their boats nine miles from Lake Superior to the Pigeon River, which leads into the labyrinth of border lakes. Their old stockade has been restored by the Minnesota Historical Society.

Jumping-off places for many plane and canoe trips into the northern Minnesota wilderness are Ely and points on the Gunflint Trail, which shoots out into the lake-strewn wilds from the North Shore Drive.

Key to this airy north country of trees and iron is Minnesota's third largest city, home of the Duluth Branch of the University of Minnesota.

Twenty-six miles long and an average of 2½ miles wide, Duluth is squeezed between rocky bluffs and the waterfront of Lake Superior and the St. Louis River. Its streets climb so steeply from the water that some give up and end in stairs. From its Skyline Parkway Drive at dusk I thrilled at the sight of starry city and harbor with its lofty, lass iron docks and varied industry.

Three-foot Christmas Trees 23 Years Old

Eighteen years ago Roy Halverson (page 306) gave up a $35-a-week job in a fruit and produce plant to sell Christmas trees. Friends shook their heads. "Crazy kid, quitting a good job. . .

But the young man had an idea—little Christmas trees, about three feet high, to be sold in large numbers at low cost. With the able help of his wife ("She's a good businesswoman," he says proudly) he topped the enormous resources of bog and black spruce growing in mossy old lake beds.

Insufficiently nourished, these trees are stunted—only 12 or 15 feet tall, and more [illegible]. They grow so thickly that [illegible] spoiled, but the top three feet [illegible] are Christmas trees.

Because their natural hue is a [illegible] green, Roy revolutionized their sale by [illegible] them green, or silver, or white. Now Halverson trees sell all over the country, and as far away as Iceland, South America, and China. Last year he sold 1,200,000, bringing three-quarters of a million dollars into Duluth—and getting a letter from the State Conservation Commissioner commending him on improving the forest.

Tree-ring tabulations show that these trees, really tops, average 75 years old.

In scouting for new Christmas tree lands, Mr. Halvorson uses a plane. All four members of his family fly.

Minnesota is a great flying State. Charles A. Lindbergh, first to fly the Atlantic alone, lived as a boy at Little Falls where a State memorial park commemorates his father, a crusading Congressman.

On a trip to the valley of the Red River of the North, in northwest Minnesota, we talked to E. M. Saul, of Crookston, one of many flying farmers and businessmen who fly to Montana for grizzly and antelope hunting. In winter he may wing to the Rio Grande to pick up ideas on alfalfa growing, and on to Mexico and Guatemala for a vacation.

At Crookston is one of the State's agricultural schools, branches of the University of Minnesota, which teach boys and girls scientific farming and homemaking. Others are at Waseca and Grand Rapids. For six months the students go to school and for six they work on the farm.

This fertile valley is a bread-and-butter land. Prominent in town after town are grain elevator and creamery.

Forests replaced farms as we swung northeast to Warroad on Lake of the Woods, gateway to the furthest-north point in the 48 states, Minnesota's Northwest Angle.*

Fresh-water Cod Yield Vitamins

At Baudette on the Rainy River, which forms the international boundary, we stopped at a neat white pharmaceutical plant—surprising, way up here in the woods. Its story is even more so.

Stocky, blue-eyed Ted Rowell, who runs this vitamin factory, was the son of a local fisherman. As soon as he was big enough to go fishing, he became acquainted with the repulsive-looking fish known as the burbot which lives in Lake of the Woods and other northern lakes. Fishermen cut their lines to get rid of the light brown, smelly, slimy, snaky looking things, and cussed them because of their appetites for good game fish.

"The burbot," says Mr. Rowell, "is very voracious and a powerful swimmer. It can swallow headfirst a northern or a walleyed pike. I've seen the tail of a one-pound northern sticking out of the mouth of a five-pound burbot."

As a boy, he noted that some of his Scandinavian neighbors fried and ate the livers of burbots, then drank a saucerful of the oil. These people seemed especially healthy, with good teeth and high resistance to colds.

Eventually, Ted was graduated in pharmacy from the University of Minnesota and came back to open a drugstore in Baudette. By this time he knew that the burbot is a fresh-water cousin of the cod; its cream-colored liver is large—as much as 10 percent of the fish's weight.

He had the liver oil tested. Back came the report: seven to eight times as rich in vitamins as cod-liver oil!

Young Rowell and his father went into the burbot liver oil business. Today their Burbot Liver Products Company processes a million livers a year and sells vitamin pills and oil capsules on a nationwide scale.

Now mayor of Baudette, Ted was on the phone when we called.

"I'm all excited today," he said as he hung up. "For five years we've been trying to build a hospital here, and now we're all set!"

Trees of North Become Paper

Farther on, at International Falls, a towering smokestack suddenly appeared after miles of border wilderness. Here the Minnesota and Ontario Paper Company, running 24 hours a day, makes paper and insulation board from one of the largest woodpiles in the world (page 308).

Driving southward for hours through second-growth forests, we crossed the Great Laurentian Divide, where a split raindrop would send part of its waters to the border lakes and the Arctic Ocean, some to the Atlantic via the Great Lakes, and part to the Gulf of Mexico.

At Virginia, Ray Glumack, ex-Navy pilot, runs Northeast Airways, Inc. In winter he goes wolf hunting by plane (page 329). Since this was summer, he invited us to fly in to a lonely lake "many miles from the nearest human being" and spend the night in a tent.

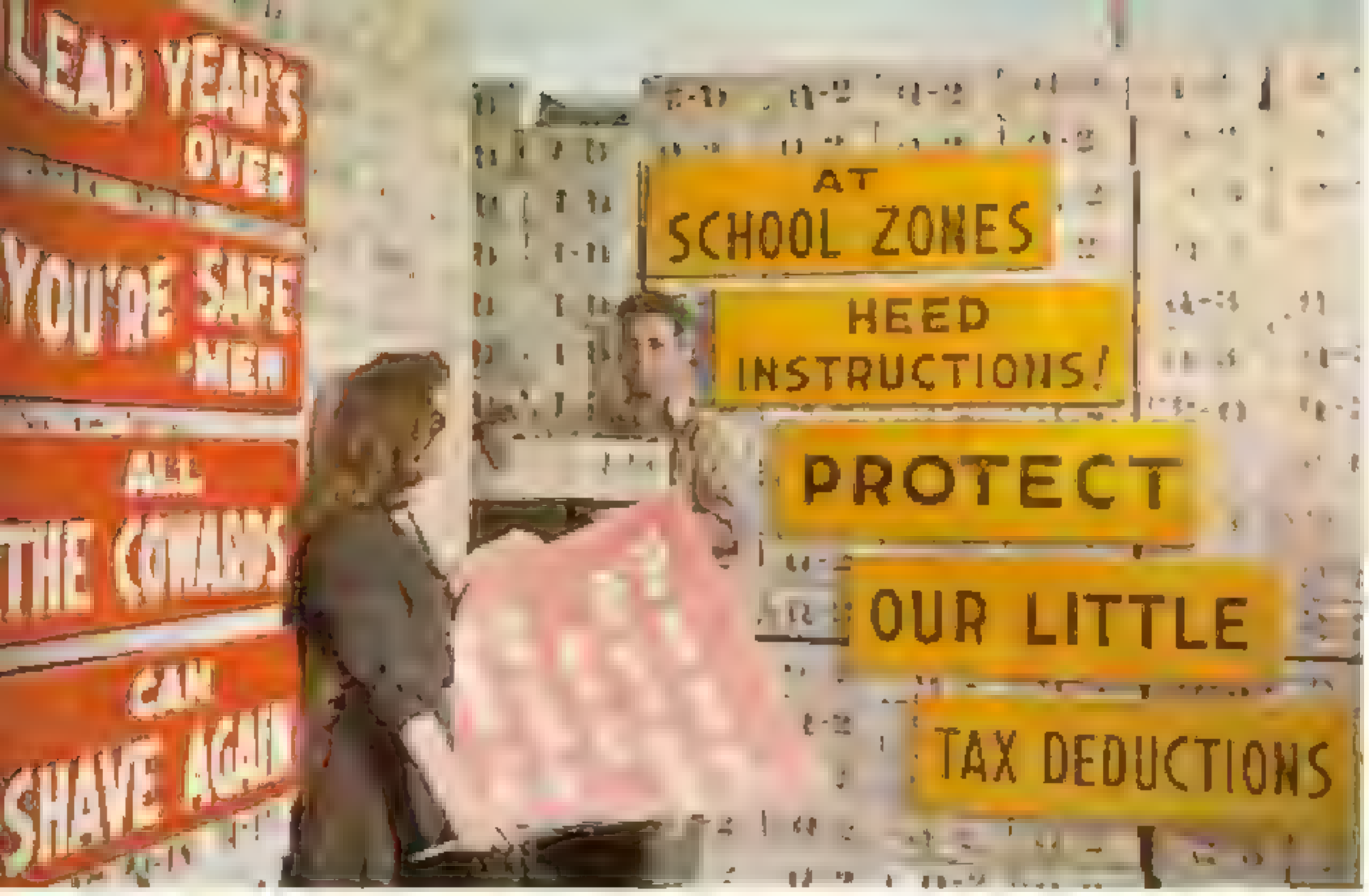
"It's Big Lake on this map," he said, "but we call it 'Tackshuster Lake.'"

Here even I caught a northern pike, and with Ray as guide we prowled thick underbrush and [illegible] lakes he had spotted from the air. New [illegible] on the wall [illegible] Women's shoes, a rocker, and toys showed a family had lived in these deep woods where every article must have had to be lugged many miles by canoe or dog team.

Why had they come and where had they gone? Was iron ore the magnet? Or a timber claim? Or furs? Or had this mysterious family buried itself in the big woods

* See "Men, Moose, and Mink of Northwest Angle," by William H. Nicholas, NATIONAL GEOGRAPHIC MAGAZINE, August 1947.

Pioneers of Children's Theater: Two Students of Hawthorne and Monadnock in a Minneapolis Park



Boys with Poor Sight Train Other Senses

A A Town Hall is Permanent Party at St. Paul

[illegible]

In Rochester, a Nurse Studies the Eye

[illegible]

Circle the Heights Above Dakota Girls Parry Snowballs and Smoke Mistress Breckinridge Hacks Beyond Axe Bashes Against Ice Lake Superior

Along the crest of Pine ridge runs Dakota [illegible]

Young Minnesotans Make Ice Cream in a "Snow Pot" Thousands Gather at Duluth

* Dressing at the Frozen Lakes, Minnesota
Often Lost Their Cars

[illegible]

* In Duluth's Old Clothes Given Free by the
Second Police Force

[illegible]

▪ Women Have Wolves Lose Homes for a Bounty of $50 Each

[illegible]

▪ Children Clutching as Parents Launch Them on a Homemade Slide

[illegible]

Graves of Pentebolt Are Lined with the Tomes Spell of Chosen in the Making

just to get away from it all because of some overpowering grief? Above the door of the one attic bedroom was a homemade gold star of paper, such as those that signified the loss of a son in World War I and II. Perhaps that held at least a part of the answer.

Deer are so thick hereabouts that all the cedars along shore are pruned to the height a deer can reach. This browse line is so sharp and level that it looks like a high-water mark made by the lake in flood.

"Granite City" and *Main Street* Town

From northern wilds we headed southwest to the "granite city" of St. Cloud, exceeded in size only by the Twin Cities, Duluth, Rochester, and Winona. Near by, the Cold Spring Granite Company quarries, cuts, and polishes huge slabs of Minnesota granite and gneiss for tombstones, mausoleums, monuments, banks, stores. During the war it made sections of ocean-going ships, and miles of anchor chain.

After winning a national reputation with his articles and books, gifted writer-architect Glanville Smith (page 298) is back here happily designing monuments, spark plugging the Cold Spring Men's Chorus, and serving as president of the Stearns County Historical Society. His writing, he says, was just a phase. This is the life he likes best.

At Sauk Centre, the *Main Street* town where Sinclair Lewis lived and wrote, I arrived just in time for a charivari, which Minnesotans pronounce "shivaree." A luckless pair of newlyweds was being ridden down the world's most famous Main Street on a manure spreader!

Such antics are undertaken when the bride and groom fail to give a dance for their playful friends.

Close to Alexandria, center of one of the State's most beautiful lake resort areas, is Kensington where a farmer, Olof Ohman, in 1898 unearthed the famous Kensington Runestone, once exhibited at the Smithsonian Institution in Washington, D. C.*

Most of the towns in the fertile southwest part of the State are primarily farming centers; but industries are establishing footholds in many. Redwood Falls, for instance, makes women's panties, and farm boys learn precision instrument making in the war-born Tubular Micrometer Company plant at St. James.

Worthington, far in the southwest corner, calls itself "the Turkey Capital." Last year it hatched 3,114,000 turkey poults, considerably more than the number of people in the State.

Austin, Home of Spam

At Austin we visited the George A. Hormel & Co. packing plant, where Spam originated. A former mayor and several aldermen work on the "dis-assembly line" where gleaming white hog carcasses are reduced to ham and bacon.

Hormel has become nationally known not only for its beef, pork, veal, lamb, and meat products but also for its labor policy. Employees are guaranteed wages for a full year ahead. Production exceeding fixed quotas yields extra incentive pay, and a joint earnings plan gives employees a share in the company's profits.

Built and maintained by grants of money from the Hormel family is the near-by Hormel Institute, a unit of the University of Minnesota doing research in biology and chemistry.

South of Spring Valley we drove through thousands of acres of peas, and saw fleets of trucks rushing the green spheres to a big canning plant at Rochester. In the fields, "viners" that thresh out the peas were working day and night.

Southward to the Mississippi, prairie gives way to rolling hills. Near the Iowa border are limestone sinkholes into which, local tradition says, whole plow teams have disappeared. We could readily believe it when we visited Niagara Cave, near Harmony, and saw its underground galleries created by running water. A farmer discovered it when his pigs kept mysteriously disappearing and he found a hole from which came grunts and squeals.

Abundant limestone feeds cement and rock-wool plants, such as those at Mankato. A more new business there is A. R. Kleinschmidt's Lakefish Canning Company, which makes a palatable product from carp, long netted from the lakes as a nuisance.

Feathers and Furs from Far Lands

Many other odd industries have sprung up hereabouts.

Who would think that the feathers of a jungle fowl from India or the hair of an African orange baboon would wind up in the mouth of an American trout because a boy in Waseca, Minnesota, loved to fish and stack insects?

Thanks to quiet, scholarly George Herter, who majored in entomology at the University of Minnesota, his home town is the center of a world-wide business in exotic feathers and furs used by anglers for tying flies (p. 311)

* See "The Smithsonian Institution," by Thomas M. Henry, NATIONAL GEOGRAPHIC MAGAZINE, September, 1945, page 341.

2496 Fishermen Camped on Ice Fishing-through-the-ice Contest on White Bear Lake in the St. Paul Winter Carnival (Page 328)

Glossmers"—Students Blend Young Voices in the Inspirational Singing of the St. Olaf Lutheran Choir, Directed by Olaf C. Christiansen

Two Thousand Tons as Much Ore as This Comes Daily From Mines to Mills

Herter's shelves are crammed with about everything but "eye of newt, and toe of frog" moose mane, gazelle hair, fox tails, golden and Lady Amherst's pheasant necks from China and Tibet, English starlings, ostrich plumes, peacock tails, porcupine quills, South American condor wings, silvertip grizzly and polar-bear skins.

Each serves its particular purpose. A single hairy fiber from a condor feather forms the body of a mosquito so realistic you want to slap it. White tips of English starling feathers are lifelike eyes for artificial minnows. Porcupine quills make buoyant bodies for floating flies. Polar-bear hairs, waterproof, have a glasslike glint that appeals to fish.

A strict conservationist, Herter buys no skins of birds or animals protected by law.

Wasecca is also the home of the E. F. Johnson Company which makes radio components and transmitters widely used by police and taxicab fleets.

At nearby Owatonna the Josten Manufacturing Company turns out class rings and other jewelry—a type of industry Minnesota tries to encourage, since the product is high in value for its size and can be shipped to eastern markets without heavy transportation cost.

At the opposite end of the weight scale are railroad equipment, made at Fairmont, and the Tilt-a-Whirl, manufactured at Faribault. This carnival "thrill ride" device was conceived when a local man took his family out in their early Ford, hit a bump at a curve on a rough dirt road, and noted how the lurch delighted his boys.

Faribault, city of schools and towers, is the home of the State School for the Deaf and the Minnesota Braille and Sight Saving School (page 324), where children study geography by touch on relief maps, improve their sight if any remains, and learn how to use the other senses, especially hearing, can tell the blind.

"People talk of the blind having a sixth sense," said a teacher, Torger Lien, sightless from birth. "Actually it's echo reflection, like radar. When I walk past a hedge, for example, my ears tell me it's a hedge, not a wall. A hedge has as much right to sound like a hedge as it has to look like one."

An Ill Wind That Blew Good

Above Rochester, city of healing, rises the 20-story tower of the Mayo Clinic, to which come thousands from all over the world as to a beacon light. Hotels and streets are crowded with seekers of health, some in the garb of India or other exotic garb. Alike to a king with failing sight and to an Iowa farm boy kicked by a horse, this is a medical court of last resort (pages 325 and 355).

Mayo Clinic might be said to have sprung from a cyclone. When a "twister" killed 22 persons and injured many more in Rochester in 1883, English-born country doctor William Worrall Mayo took charge of an emergency hospital and was aided by Sisters of the Order of St. Francis.

Six years later, at the request of the Sisters, Dr. Mayo and his surgeon sons, William James and Charles Horace, undertook direction of a 40-bed hospital erected by the Order on Rochester's outskirts. This formed the nucleus of the present St. Marys, largest of the city's hospitals.

Today this world-famed clinic makes Rochester one of the Nation's distinctive cities. Its business is health; its whole life revolves around the Rommesque tower in its heart. Half a mile of tunnels under downtown streets connect the clinic with hotels and hospitals. From atop the tower waft the notes of the Rochester Carillon of 23 bells; the largest weighs nearly eight tons.

Head of one of the several sections of general surgery is Dr. Charles W. Mayo, fondly called "Chuck," grandson of the original Dr. Mayo.

The clinic building also houses the Mayo Foundation, affiliated with the University of Minnesota; outstanding young doctors from the Nation's medical schools are chosen for postgraduate study here.

The Mayo Clinic leans over backward to avoid criticism on the score of self-aggrandizement. A few years ago some Rochester youths organized what they called the Surgeons City Motorcycle Club and rode around the countryside in shirts bearing that name. At once the Mayo doctors were disturbed lest this look like advertising. An emissary to the motorcyclists induced them to abandon the name and accept a present from the Clinic—new jerseys lettered Rochester Motorcycle Club.

Some of Minnesota's finest scenery lies along the Mississippi east of Rochester. Mark Twain called it "tranquil and reposeful as dreamland . . . . nothing to hang a fret or a worry upon." This sense of peace was heightened by the sight of 18 pelicans playing like kids on the otter farm of Emil E. Ziegler at Homer.

High bluffs look down on the widening of the Mississippi called Lake Pepin and on the college campuses and factories of Winona. This little city makes many products, from lox tow to bricks and dirt diggers.

One of its oldest and biggest industries is

Rochester's Chief Subject of Conversation Is Barred at This Restaurant

[illegible] Clinic [illegible] the world. Holland's [illegible] to pronounce a [illegible] interpreting Northwest [illegible]

[illegible] R. Watkins Company, [illegible] "Watkins Man," drive up [illegible] calling out a free sample and a [illegible] Founded in 1868 on a liniment [illegible] least" the company now [illegible] a huge line of multiflora cosmetics, spices, soaps, extracts, disinfectants. Also known countrywide is the pottery produced at Red Wing on the Mississippi.

Nestled in quiet college towns are many of Minnesota's 45 accredited fonts of learning. Typical are Carleton College and Norwegian Lutheran St. Olaf, famed for its choral singing (page 333), at Northfield, and Swedish Lutheran Gustavus Adolphus College [illegible]

Minnesota's Greatest Century

[illegible] watched a Northwest [illegible] for Alaska and the [illegible] DC-4 would be [illegible] in 36 hours and [illegible] than the time it took [illegible] centennial postage stamp.

Yet forward looking Minnesota [illegible] greatest century? That's the one ahead

Power Comes Back to Peiping

By Nelson T. Johnson and W. Robert Moore *

THE [illegible] to [illegible] Peiping (Peking)† now stands for 3,000 years. Under one name or another and from time to time, that has been China's capital, even as it was when the Mongol empire stretched from Siberia to beyond Moscow and south into Mesopotamia.‡

The Peiping we know, with its mighty walls and temples, was built as late as 1421. And, though Nanking has lately been China's seat of government, it seems now that Peiping may again become the center of power, if not of China's wealth and glory.

Peiping's Face Is Still the Same

News dispatches say that while the Red invasion has not changed the structure of the city and its normal way of life, its once luxurious habits are so different that Americans and other foreigners who knew it in its palmy tourist times would now hardly recognize it.

Such famed hotels as the Pékin and the Wagons-Lits no longer shelter foreigners. Guarded by sentries, they are reserved for Chinese Communist officers and officials. Drab uniforms are everywhere. Men in European dress are scarce.

Though workers still follow their old trades when they can get work to do, the once wealthy banking and merchant classes are in eclipse. Some curio shops are closed or have gone into other lines of trade. Busiest spot seems to be the popular open-air market, a sort of hawkers' bazaar set up outside the old Legation Quarter.

Americans and other foreigners, quitting North China, many via Tientsin and the sea, say Peiping is crowded now with newcomers, including hordes of country boys who ride in on their shaggy ponies. Crowds of young people frequent the bookshops, where literature of a new ideology is available (pages 338, 344, 364, 368).

If it is true that Peking is again to be China's capital, that fact is significant, because Peking was always the seat of governments whose primary interests centered upon events occurring north of the Great Wall (map, page 341).

Dominating the fertile Yellow River (Hwang Ho) plain Peiping commands the passes to the Mongolian plateau, through which wild horsemen from the north made their raids. It was against them the Great Wall was built.§

Peiping also commands the narrow passage between mountain and sea at Shanhaikwan (Linyu) to the east; through there, from Manchuria in 1644, came the Tatars, to begin the Manchu conquest of China.

One Chinese said that the Chinese Republic had done well to shift its capital from Peiping to Nanking, "For," he remarked, "the old city of Peking seemed to cast a spell over all those who went to live within its walls."

Everyone who has been to Peking has felt this spell. It seems to descend on him the minute he passes through the tunnelike entrance of the Chien Men, on his first visit to the city (page 362).

City Built as God-Emperor's Capital

Perhaps the sense of this spell, or "atmosphere," is felt because Peking is the last great city of China to be built for the specific purpose of accommodating the pomp, ceremony, and pageantry of a God-Emperor, Vice-regent [illegible] Heaven. The imperial rule was accompanied by religious rites meticulously observed in audience hall and at state shrines, carefully established in relation one to the other.

As with Babylon and Nineveh, so with Peking; tons of books have been written about it, and here is space for only this brief sketch. As we said, it's had many names, beginning with one old city just to its northwest, named Chi.

Even before Marco Polo came, Genghis Khan had been to Peking.

To Polo, the great Mongol capital of Kublai Khan, grandson of Genghis, was known as Cambaluc, or "City of the Great Khan." Venice wouldn't believe Polo's wild tales that rocks (coal) burned here, that money was

* Both authors of this article have long known China. Nelson T. Johnson went East as a State Department language student in 1907 and later rose to the rank of ambassador. W. Robert Moore has covered thousands of miles in China as staff writer and photographer for the NATIONAL GEOGRAPHIC MAGAZINE.

† The old name Peking (meaning "Northern Capital") was changed to Peiping ("Northern Peace") in 1928 by the Nationalists after the capital was moved to Nanking.

‡ See, in the NATIONAL GEOGRAPHIC MAGAZINE: "New Road to Asia," by Owen Lattimore, December, [illegible] "People of the Wilderness (Mongols)," [illegible]

§ See, in the NATIONAL GEOGRAPHIC MAGAZINE: "A Thousand Miles Along the Great Wall of China," February, 1923.

Pictures of Victory: Men, Mules, and a Portrait of the Red Leader, Mao Tze-tung

[illegible]

[illegible] Mao Tze-tung [illegible]

Young, [illegible] and work. Young [illegible] and

[illegible] with the [illegible] metropolis. And Chien Lung, fourth emperor of the Manchu [illegible] This contemporary of George Washington [illegible] and [illegible] of his [illegible]

[illegible] and [illegible] the Temple [illegible] (pages 341, 34[illegible]) [illegible] published up [illegible] palaces and [illegible] with bronze [illegible]

[illegible] Mao [illegible]

slabs. The place is covered with his name. Between 1930 and 1937 the Republican regime again cleaned and painted and repaired Peiping till it shone under the brilliant northern sunlight.

Peiping Saved from War's Destruction

War years altered this historic city but little. No heavy fighting took place within the walls; it suffered no destructive bombings.

Such changes as the Japanese made were largely constructive; they had come expecting to stay—and prosper. They built new roads out from Peiping, asphalted some of the dusty streets, repaired sewers. Outside of town they erected a new row of homes and established a station of agricultural research.

But none of these projects made conspicuous physical change. In truth, much of the city's charm and persistent allure lies in the fact that its broad imperial pattern has suffered little violence in 500 years.

Five centuries, however, is but a brief span as heavy, historic Peking measures time. The roots of the city reach deep into its earth, trod upon for well over 30 centuries.

But the term "city" in speaking of Peking is not accurate. There are cities within a city and a city beside a city, each having its own circuit of walls. And what walls these are! Finer and more solid ones will not be found anywhere (map, page 340).

Perhaps the building of walls, more than anything else, distinguishes the Chinese from other peoples. A wall is as necessary to a man in China as clothing to a woman of the West. When the emperor wished to punish a city he would tear down its wall, leaving it naked. Every Chinese wants a wall about his home. This may be either a wall of brick or a living wall of bamboo or thornbush hedge.

As originally built by Yung Lo, Peking formed a square enclosed within high battlemented walls nearly 15 miles in perimeter. This came to be known as the Inner, or Tatar City, and also later as the Manchu City.

Within this was the smaller Imperial City where court functionaries dwelt.

In the heart of the Imperial City was that inner Reserved City, or Forbidden City, of the God-Emperors, the Palace itself, where few persons other than royalty were ever allowed. A wide moat and high red walls set apart this long-mysterious, golden-roofed area of intrigue and tragedy.

When the Manchus ousted the weakened Mings (for few were as tough as powerful Yung Lo), they forced the conquered Chinese from the main city, reserving it as a residence area for the Manchu Bannermen and their families.

Chinese artisans and tradesmen then took up residence outside the walls, in the Outer, or Chinese City. It adjoined the Tatar City on the south and had its own walls.

Thus Peking came to be a city of four cities, each with its own purpose and people.

Five Cities in One—That's Peking

To these four cities was added, under the Boxer Protocol of 1901, a fifth city, also surrounded by a wall. This was known as the Legation City. This small area, with its legation guards, separated like a moiseau ghetto from the great city of Peking, became a picturesque international settlement on its own account, with shops, churches, banks, hospitals, and hotels, as well as the several legation and embassy compounds.

German, Austrian, and Russian guards did not return after World War I. And now all are gone, and the administration of the area has been returned to the Chinese city authorities with the cancellation of the old privileges. No more "extraterritoriality" or treaty ports!*

Since the imperial rulers and their hangers-on have departed, most of Peiping's court and political barriers have vanished, but not the physical walls, which remain to recall the pomp of other days. Only the red walls that once enclosed the Imperial City have been taken down to make way for traffic.

Trees in places have clawed their strong root fingers in between the bricks of Yung Lo's city wall and erosion has chewed away some of the softer surfaces. As a whole, however, the old fortifications are intact, symbol of an age when walls were more protective than now.

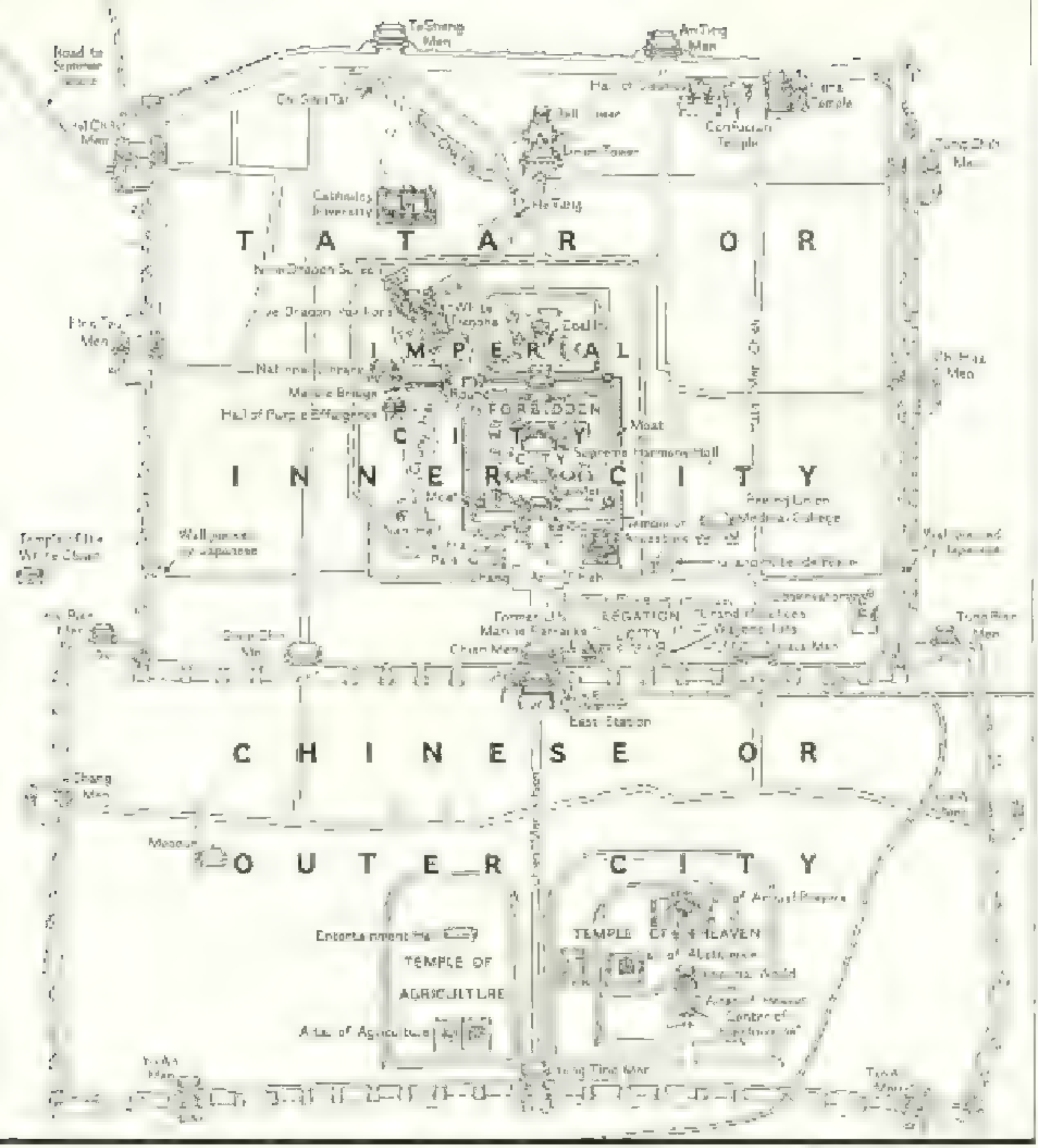
At each of its nine gateways rise elaborate towers. About the only alterations made are passageways sliced through the thick barriers to supplement the nine gates.

Japanese Hacked Two Holes in Walls

Four tunnels, two on either side of the Chien Men, or central south gate, now carry the heavy traffic between the Inner and the adjoining Chinese City. Formerly this heavy commerce of people, donkeys, camels, carts, motorcars, sedan chairs, and other vehicular traffic had to squeeze through the single bottleneck gateway (page 342).

To facilitate their own movements, the Japanese hacked two holes in the walls, one on the eastern and the other on the western

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Coastal Cities of China," by W. Robert Moore, November, 1944.



High Thick Walls, Pierced by Towered Gateways, Encircle Historic Peiping

[illegible] Hai, Chung Hai, and Pei Hai, meaning "South," "Middle," and "North Seas," formed a vast formal garden. Chinese name for gateway is *men*, which is street.

side, almost in direct line with the city's widest east-west street, the Chang An Chieh.

Unlike most Chinese cities, Peiping has many wide, straight thoroughfares which cut into rectangles. Yung Lo probably got the idea for these broad avenues from Kublai Khan, who plotted his roads so wide that his horsemen could gallop down them nine abreast!

Today automobiles and trucks whiz along the streets through the tangles of plodding donkey carts, wheelbarrows, rickshas, pedicabs (popular three-wheeled bicycle-rickshaw combinations), and jaywalking people.

And there are bicycles—thousands of them, darting everywhere. Long queues of men riders flap in the breeze; girls with tunielike slit dresses reveal surprising lengths of leg.

Crowded, clattering streetcars lurch unsteadily along, carrying people to and from work. Occasionally a camel caravan sidles in great dignity through the streets, bringing coal from the Western Hills.

Passing now from Peiping are many of the long wedding processions, reminiscent of past century when the city was the residence of the God-Emperor.

Funeral processions are not so long. What with mounting costs and the Government's insistence that lavish displays be curtailed, mourners now have fewer hirelings from the Beggars Guild parading in misfit ancient costumes, fewer musicians with flutes and gargantuan yellow drums, and fewer paid mourners.

Glitter faded here when rulers quit the Dragon Throne. But how magnificent that procession when, as at winter solstice, the emperor and his long cavalcade of courtiers moved slowly out the front gates of the Forbidden City!

Through the Chien Men, whose center portal was opened only for the imperial person, the stately train moved through a street lined on both sides with blue curtains so the vulgar might not see His Majesty! At such times after 1900 the American Marine sentry on the Tartar wall behind the American Legation would walk to the other end of his post, where he could not be seen and where he could not look down upon the Imperial presence.

In Temple of Heaven Emperors Prayed

Straight south went the procession, to enter the walls of the Temple of Heaven, and thence to the Hall of Abstinence, there to fast in preparation for the ceremony at dawn in the circular Altar of Heaven. There the God-Emperor made sacrifice to the only superior force he knew—the invisible forces of Heaven (page 360).

Just north of this altar, whose central stone slab was considered the center of the universe, is a small building, the Imperial World, where the spirit tablets of the emperors were kept.

Still farther north, along a marble causeway, stands the magnificent circular building with blue-tiled cone-shaped roofs, often misnamed the "Temple of Heaven" (page 347). (In fact, the "Temple" is the whole area within the walls.) This triple-roofed structure is a shrine to time, to the rhythm of Heaven's rewards and punishments.

Chinese call this shrine Pavilion to the New Year or Hall of Annual Prayers. Within its lofty, lacquered interior the emperor each spring caused burnt offerings to be made and prayers to be said for a good harvest.

Red Armies Now Dominate Much of Coastal China

[illegible] from Mukden the Chinese Communists thrust southward from the Great Wall to capture such key points as Peiping, Suchow (Tungshan), Nanking (the Nationalist capital), and Shanghai.

No place outside the Imperial City had greater dignity of structure than the round Altar of Heaven, with its complete absence of iconolatry, and this shrine to the New Year, both within a sacred cypress grove.

Today the smoke of the burnt offering ascends no longer through the cypresses under the silent light of dawn. No longer is heard

Crystal Waters from Jade Fountain Irrigate Rice Fields on the Plain

[illegible]

Canals from the Springs Also Feed the Summer Palace Lake and the "Seas" in Peiping

Still Dancers Provide a Grotesque Form During the Invaders' Entrance into Peiping

[illegible]

Papa Points to the "Birdie," but Little Peking Wou[illegible] Smile

[illegible] the [illegible] of dancers as the sky begins to brighten [illegible]

[illegible] performed only [illegible] with [illegible] nasty. [illegible] once since that day in 1912 has the ceremonial [illegible] of the altar been set up. That was [illegible] Yuan Shih-kai sought to mount [illegible] Throne. But Heaven showed its displeasure through a revolt in the provinces. Yuan soon sickened and died—it was said, of a broken heart.

Sacred Cattle Used for Serums

Today the sacred herd of cattle once kept for the sacrifice belongs to the people and is used to furnish the serum for prevention of smallpox, cholera, and typhoid fever. The area within the walls of the Temple has been thrown open as a park, and the common people and the traveler from afar stroll within [illegible] precincts at will.

Here lately one Chinese with a mouth organ [illegible] playing *[illegible] the Heart of [illegible]*.

The [illegible] the way, where the [illegible] playing [illegible]

[illegible]

[illegible] accurate plan for the building of the city was plotted to fulfill every [illegible] of architect, astronomer, and master of [illegible] [illegible] But were Yung [illegible]

designer, to emerge from his tomb and revisit the palaces, he would be astounded. Today idle crowds are allowed to stroll through corridors and throne halls, and peer through the windows of the residential quarters upon the trappings which were assembled for royal eyes alone.

Some halls have been converted into museums where one may see the cultural productions of one people over a long historical period. They begin with pottery of Neolithic times and continue with magnificent bronze ceremonial vessels of 3,000 years ago, grave figures of the Han period (206 B. C.–A. D. 220), paintings of the Tangs, books of the Sung; and so on. Here one can study, in the ceramics of one people, the amazing development of porcelain, its glaze and decoration.

Where is another people who can display a similar wealth of creative craftsmanship over a span of 4,000 years?

Portraits Assembled from "Spare Parts"

Emperors and their consorts—noble, impassive, and weak—stare from old spirit portraits of the Manchu rulers, painted with no trace of shadow. All save the many paintings and photographs of "Old Buddha," the Empress Dowager Tzu Hsi, are posthumous pictures done by artists who had never seen their subjects (Chinese did not paint portraits of living people).

It was the custom for artists to present three books of varying stock features, and relatives would then select the ears, nose, eyes, shape of face, etc., that best fitted the departed. For the painter it was purely a matter of assembly!

One wonders if even the portrait of Chien Long doesn't wince at times over the unusual interest Palace visitors now show in the picture room and bath of that yearning Moslem beauty, the Stranger Concubine, a princess of Kashgar, whose favor he courted here but whose affections he never could win (p. 363).

A Man-made Hill Overlooks the City

Just outside the northern gateway of the Palace rises Mei Shan, or Coal Hill. This is a five-peaked man-made hill, believed built of earth excavated from the moats and lakes of the palaces. Mei Shan was placed north of the Palace to protect it from the evil influences that drift down from northern regions. From its top, on a clear day, one may see the Great Wall here and there as it climbs the ridges to the north.

The last Ming emperor committed suicide at the eastern foot of Mei Shan.

Linked with this hill also is the tale of a court painter who was commanded to decorate the walls of a pavilion. Hastening to the Palace to answer the summons, he was received by a prince.

"Serve us well and we shall know how to reward you," said the prince. "Meanwhile, have you any requests to make? What models do you desire, O famous painter?"

Instead of asking for a group of persons with [illegible] or [illegible] decorations he might copy, the painter walked to the doorway of the pavilion and pointed to the city at his feet—the gates, temples, carts, donkeys, and the people passing in the street.

"These, Your Highness," he answered, "are my models."

"But that is not beauty—only drab monotony."

"Pardon, Your Highness. That is life."

This is Life now! The "drab monotony" still courses the streets—the carts, the wheelbarrow men, rickshaw pullers, cyclists galore, and the venders who set up shop at the very gateways of the palaces to sell fresh peeled turnips, pears, and persimmons. But the princes are gone.

Coal Hill is a people's park. All during the year when weather is good, families, fond couples, and long frocked poets climb the hill and sit to sip tea and gaze at the city (page 350).

Reminders of Kublai Khan

Look straight north from here and you see the Drum Tower and roof tip of Bell Tower, almost immediately behind it.

These or their counterparts (history is unsure) are older even than the present Peiping; for Kublai Khan built a drum tower in the exact center of his city shortly before Marco Polo visited his court.

For centuries that big bell sounded the curfew, and the booming drum marked the watches of the night. But now the bell is still and the drums have vanished. Instead a screeching Jap-installed siren on Coal Hill blares at the stroke of noon!

Off to the west, hard below the conspicuous landmark of the White Dagoba (page 348), is another structure dating from the days of the Great Khan. Follow the roadway down through ornamental archways and you come soon to the Round City, the platform of one of the palace buildings of Kublai Khan.

Here sits the famous white Jade Buddha, which is not made of white jade but of alabaster. It has no link with the mighty Khan.

The Round City lies beside a "sea," the Pei Hai, one of the three artificial lakes whose lovely water expanse helps make here an

Before a Modern Chinese Girl, the Shrine to the New Year Symbolizes a Bizarre Empire

Through an Imperial Archway, the Bottle-shaped White Dagoba Pierces the Skyline

[illegible]

Morning Sunshine Warms Shoppers in Search of Early Bargains on Hato Mien Street

[illegible]

From the Summit of Coal Hill, Delphia, Appears a Terribly Wounded City Against a Backdrop of Mountains

[illegible]

The Flower Market Attracts a Wealthy Merchant

[illegible]

In Occidental Hats They Read Oriental News of the Day

[illegible]

Small Boy on a Magic Carpet? **No, Young Merchant Guarding His Oriental Rugs**

[illegible]

As in Some American Groceries, "Cash and Carry" Prevails in the Vegetable Market

[illegible]

This Sergeant's Moustache Cost, Once Worn to the Imperial Hussars, Would Be a Giant

A Descendant of Mandarins Models Another Rabbi's Embroidered Coat

[illegible]

Beside the Tracks of Their Old Enemy, the Trolley, Rickshaw Boys Trot Passengers Past the Shops of China's Main Street

When [illegible] a quarter, an Peiping mob of rickshaw operators overturned them. A [illegible] way [illegible]

A Luscious Array of Home-grown Fruit Tempts Passers-by

To Satisfy a Craving for Sweets Try a Jujube

Guarded by a Mammoth Stone Lion, the Gate of Heavenly Peace Leads Toward the Palaces

Waiting for the Trenton Train to Arrive, Rickshaw Boys Stand Beside Their Two-wheeled Taxis at Pennsy's East Station

Although a Beggar, He Carries Himself with Dignity

Undernourished? Not with These Pudgy Cheeks

General [illegible] Glazed Russian Looks Down on Pergamon's Finest Gems

[illegible]

Oriental garden of extraordinary charm. Marble bridges span the seas and barges carry visitors to the islands.

In the golden days of the Khans these lakes were only ponds which the earlier Chin rulers had dug and filled. The Khans turned them into pleasure grounds and game parks.

Yung Lo, who later gave the Forbidden City its mathematical precision, must have grown tired of rectangles and squares. In these ponds he saw new possibilities. He would build a garden, with miniature seas and islands and temples and vistas, on a scale such as the world had never before seen, and would probably never see again. He dredged the ponds and made the three "seas," using the dredged earth to make a "mountain."

Around the shores of his seas he created a series of lovely landscapes and water vistas which require no geometry lessons to enjoy.

The Manchu successors to the Chinese Mings resorted here. Water pageants were held on the seas, with mimic naval battles and fireworks, and here in the winter, when the seas froze over, attachés of the court would skate.

Buildings Bear Poetic Names

What a picture names alone can conjure! Here about the Three Seas is the Hall of Purple Effulgence, a Temple of Ten Thousand Virtues, a Kiosk of Clouds Reflected in the Waters, Pavilion of Darting Fish, Hall of Beautiful Waves.

Such poetic names for buildings indicate that the whole walled area of the seas was intended to be the greatest Chinese formal garden ever dreamed of.

At Nan Hai, or South Sea, the soldier, administrator, and model sovereign of the Manchus, Chien Lung, built a two-story Home-looking Pavilion, now used as a gateway, and a mosque for his Stranger Concubine, so that she could gaze at the hills in the direction of her native Kashgar and also hear the muezzin call the faithful to prayer.

Here the Empress Dowager walked the crooked Bridge of Ten Thousand Years. Here she used to go boating in her clumsy barges, and, it is said, ordered bombardment of the foreign legations to pause for an afternoon in 1900 so that she could picnic in peace.

Today the seas have become public parks. In winter young folk flock here to skate or be sledged about on the ice. Throughout the summer crowds come to drink tea or nibble watermelon seeds.

Across the Pei Hai, or North Sea, just a short distance beyond the Five Dragon Pavilions of the poets, is the famous Nine Dragon Screen, its varicolored squirming dragons disporting themselves upon blue rocks and green waves.

Other temples are placed around the north shore. Near by is the Altar and Hall of Imperial Silkworms in a grove of mulberry trees.

At the western end of the arching marble bridge which divides the Middle (Chung) and North Seas stands a unit of some of the newest buildings in Peiping—the National Library. In addition to its modern working library, the buildings house the imperial library of Emperor Chien Lung and other valuable volumes laboriously written by hand.

Practical adaptation of Chinese architecture appears also in the buildings of the Peking Union Medical College (built by the Rockefeller Foundation), Catholic University, and Yenching University. The last lies outside the city toward the Summer Palace.

Much has been written about the retreat of the universities from Peiping and other cities into the interior, following the attack by the Japanese. So far as possible, faculties and students withdrew to parts of free China and continued their studies.

Only Catholic University continued to function in Peiping then without interruption. Just now, the outside world knows little of Peiping university life or of the patrons of its libraries.

In Donkey Hoof or Dog's Neck Lane

Despite the spaciousness of parts of Peiping, not all of it is made up of extensive palaces, open parks, and wide courtyards.

Portions of the Tatar City are packed with residential quarters reached by myriad narrow twisting *hutungs*, or lanes, which thread between high mud walls.

Dusty when dry, these narrow lanes become a puree of thin mud when it rains. In and out of them ply merchants, secondhand men, and hawkers of many kinds, to cater night and day to the varying needs of the homes behind the walls. Each has his own distinctive call, full of meaning to housewives behind the wall—horn, rattle, and musical whistle.

Quaint are the names of some lanes. Here are Donkey Hoof, Dog's Neck, Bean Sprouts, Foreign Kitten, and Head Shaving Shed Lanes. Searching further, you find Pitch of a Thousand People, Chase the Thief, Great Man of Limitless Strength, and Nice Lady.

Wander down side lanes off main thoroughfares and you enter a maze of banner-draped shops, restaurants, home industries, and dwellings. Here is busy, noisy Peiping at work.

Peiping Residents Look On as Well-equipped Chinese Communist Soldiers Troop into the City

China's Ferment Changes, but Her Age-old Rice Cultivation Remains the Same

[illegible]

[illegible]

[illegible]

[illegible]

Closer to the Entrance to Chang's Mausoleum Was the Circular Altar of Heaven (Underground)

In China, as in many Oriental lands, shopkeepers dealing in the same sort of goods pick the same locality. Branching off from Chien Men Street, therefore, are Jade Street, Brass Street, Silver Street, Lantern Street, and others which once sold kindred wares.

Artisans in these materials flocked to Peking in the days of the Empire, for supplying the [illegible] perous business. But now?

For years Peking was a rare curiosity shop, combed, over and over by expert buyers. Like the heart of the nation, the city attracted people from its four corners.

Some restaurants catered to particular tastes. By proper selection you could sample the fish dishes of Fukien, velvet chicken from Shantung, pork Soochow (Wuhsien) style, and specialties of Shanghai, Canton, or far [illegible]

There were also many Moslem restaurants whose mutton dishes afforded a memorable treat. And nobody of good judgment ever passed up one of the famed Peking duck dinners!

Temples to Many Deities

As varied as Peiping's food and its peoples are the temples scattered over the city, its plain, and the Western Hills.

A famous mosque stands in the center of the Moslem section of the Chinese City, but from its exterior it looks like an ordinary Chinese temple.

"House of Prayer" is the name hung over its door, the same name, Li Pai Tang, as that applied to the chapels of the Protestant [illegible]

Elsewhere are Buddhist and Taoist shrines, altars to the Goddess of Mercy, sanctuaries to the Gods of Fire, Rain, and Thunder; lama temples, and edifices to Confucius and to Kuan Ti, military hero of 17 centuries ago.

In the northwestern part of the Tatar City are three golden-roofed structures that once enjoyed royal support. One is the Lama Temple, with its corrupted Buddhist rites of Tibet and Mongolia.

Another shrine is the Confucian Temple within whose large Hall of Great Perfection is a simple wooden spirit tablet to the sage, supported by tablets to his disciples.

In the entrance courtyard one may see rows of marble slabs inscribed with the names of scholars who passed the state examinations during various dynasties.

Adjoining this shrine is the Hall of Classics. In pioneer Mongol days here was a private school. Under Yung Lo it became a national university.

In cloisters of the courtyard are some 300 stone tablets engraved with the complete text of the Chinese Classics. These are all written in the hand of Chang Heng, whose beautiful characters impressed the literary Chien Lung and whose portrait is etched on one slab. From these engravings can be taken rubbings which give a copy of the authentic text as established by Chien Lung.

Just to catalogue the temples that lie without Peiping's walls and in the Western Hills would take many pages. Well known is the Temple of the Great Bell, with one of the largest hanging bells known anywhere. The estimate of its weight is 116,000 pounds.

There is the Temple of the Sleeping Buddha near the Western Hills. In one of its halls is a barefoot sleeping Buddha some 50 feet long. Devotees have presented him an odd collection of footwear, some made of silk, some of paper, and of differing sizes up to more than two feet in length!

Rare Peking Deer Now at Home in New York Zoo

In the Western Hills near by is the hunting park which was the home of a peculiar deer, the milu, or Père David's deer. The Chinese, at a loss for a name for this strange animal which was neither cow nor deer, horse nor goat, and yet had something of them all, finally gave up and said that there were at least four things it did *not* resemble!

Four specimens of this deer, now extinct around Peiping, were brought from England in 1946 to the Zoological Park in New York, the first of the species to be exhibited in the New World. Happily the flock has already increased, for a fawn was born in April of this year.

On the plain and up the sides of the Western Hills are old stone towers and segments of walls, some similar to walls seen in Tibet, used by Chien Lung to train his armies for service in Tibet and Turkistan.

Empress Dowager Built the Summer Palace with Navy Funds

Most fascinating spot is Jade Fountain, so called because of the clarity of the water that gushes in a great stream from this isolated hill. From this spring, water is taken to the lake of the Summer Palace near by, and by canal to fill the lakes and moats of the city of Peiping (pages 342-3, 365).

The Summer Palace was built by the Empress Dowager after an older one was destroyed by British and French soldiers in 1860. Here she held out, with money appropriated for ships for the Chinese Navy, formal

Peiping's Old Gates Echo to the Arrival of New Victors

To Mongol, Ming, Manchu, rulers of Republican China [illegible] The [illegible] bearing red [illegible] American [illegible]

[illegible] on a grand scale.

At the Summer Palace is the grave of Yeh-lu Ch'u-ts'ai, great scholar and statesman who helped the Mongols pacify the Chinese and bring them under Mongol rule.

Some distance to the south is a Taoist shrine, the Temple of the White Cloud. Genghis Khan rebuilt it.

It was to this temple that the famed Taoist monk Chang Chun came to live, and here he died at the age of eighty in 1227. He was revered by Genghis Khan.

It is recorded that at the Khan's summons he left his retreat in Shantung and traveled all the way to Genghis's camp in central Asia beyond Balkh. The Mongol conqueror wanted to talk with him.

What conversations these two had, the old monk and the greatest conqueror of all time, must have had! These men traveled far, brought great changes, and planned large.

Genghis died before the conquest of China was complete. It remained for his grandson, Kublai Khan, to carry out that grandiose scheme and from glittering courts here to rule his vast empire, which stretched from northern India to the Sea of [illegible]

That regime flourished and fell, as did others before and since. And now from the north conquerors have come again.

* See, in the National Geographic Magazine: "Peiping's Happy New Year," by George Kin Leung, [illegible] Robert Moore [illegible] Magazine [illegible] National Geographic Magazine [illegible] Index [illegible]

First Motor Sortie into Escalante Land

By Jack Breed

With Illustrations from Photographs by the Author

THE station wagon groaned and creaked [illegible] to the top of a [illegible] dune and nosed down the other side. Behind it lay 30 miles of such trackless, rough terrain that only by a miracle had the car kept going.

Ahead stretched a mysterious land of weird shapes carved by wind and rain: a wonderland of ember-glowing rocks, sabre-like peaks, awesome canyons, and delicately chiseled natural bridges looped in gleaming arches against a steely sky.

The lead vehicle of our Escalante Expedition of 15 adventurers stood at the edge of the last frontier in Utah, one of the least known wilderness areas in the United States. Our mobile headquarters was this handsome Pontiac station wagon, which carried the flags of the National Geographic Society and the Explorers Club of New York (page 372).

Generous citizens from neighboring towns, and especially the U. S. Bureau of Land Management, had contributed three jeeps, two trucks, 35 horses, and all the food. Rollin Usher, of Cortez, Colorado, had lent us his trim Stinson monoplane for aerial work; and Art Greene, of Marble Canyon Lodge in Arizona, had agreed to meet an overland group at Hole in the Rock crossing with his special boat and take us on Colorado River trips.*

Mystery Land near Bryce Canyon

By flying southeast from Inspiration Point a visitor to Bryce Canyon National Park can look down on the Escalante Country, named for the Spanish padre who explored the area at the time of the American Revolution (page 379 and map, page 380). Like many curious people who view the region from there, we, who were now much closer, were anxious to find out just what was hidden among all those cliffs and canyons.

"Did you ever hear of any natural bridges or arches in this country?" I asked John Johnson.

"Yes," he said, "I've heard tell of one or two, but in my 40 years here I've never seen any. I'm always too busy looking for stray cattle or good grass feed to notice the scenery."

Leaving Cannonville (page 376), we dropped off the roadway into Paria River Valley, following the stream bank until we were able to cross. We continued on a rough, sandy trail east toward Dry Valley and a chalky precipice near Slickrock Bench. After ten miles we came out into a broad, flat valley, open to the south but hemmed in on the north by thousand-foot white sandstone cliffs.

A Color Photographer's Paradise

It was beautiful and fantastic country. A mile to the left near the base of the cliff I could see red pinnacles thrust up from the valley floor. The few natives who had been here called this area "Thorny Pasture," but we renamed it "Kodachrome Flat" because of the astonishing variety of contrasting colors in the formations.

Here rocks, towers, pinnacles, fins, and fins surrounded us. Everywhere the results of erosion could be seen in all stages (pages 374 and 375).

Continuing southeast, we fought our way over sand dunes, ledges, and rock benches and through numerous washes. I was glad the car had oversize tires and extra-powerful gears.

At 4 o'clock we stopped high on a plateau near the upper Wahweap basin and climbed to the top of a commanding mesa. With binoculars I scanned the country beyond us. Carefully studying every fold and canyon in a high white palisade four miles to the north, I thought I could see a break through one of its numerous fins. The others agreeing, we set forth toward the gleaming palisade.

Our biggest expectations were soon realized. What we saw was an arch—a new arch, uncharted and unnamed!

This striking natural bridge is carved from creamy rock, a rarity in a land of brilliant reds. Actually, it is a double arch, with the larger span on the end of a buttress that juts from the main sandstone butte. Near the anchor end wind has blasted a smaller hole through the buttress (pages 371 and 373).

* In the party were Don Mobley, range manager for the United States Bureau of Land Management; Alden Cameron and Bryan Kelly, Bureau foremen; Ralph Hurt, and Rollie Allen, all of Panguitch, expert pack drivers; John Johnson, Wilfred Clark, Hooke Clark, Sam Pollick, and Tom and Clark Smith, from the Mormon towns of Tropic, Cannonville, and Henrieville; ranchers who knew the region and lent horses and made services; Herbert Gordon Ballard, of Utah State Agricultural College; David Hart of Santa Barbara, California, and the writer.

Later a U. S. Geological Survey crew measured the gigantic creation of erosion. It is 152 feet high, 99 feet wide, and only four feet thick at the top of the span. As far as we could learn, we were the first to find it.

We named this feature "Grosvenor Arch" in honor of Dr. Gilbert Grosvenor, President of the National Geographic Society, the man who, we all agreed, had done more than any other person to arouse public interest in geography.

First Camp in a Ghost Town

After charting this natural bridge we established our first field camp in the deserted settlement of Paria, 50 miles down Paria River from Cannonville. The setting was reminiscent of a Hollywood western in technicolor. Bright red, pink, and white cliffs hemmed us in on all sides. Several rustic log cabins dotted the canyon floor where the river had cut a swath half a mile wide in a broad bend. Swaying cottonwoods and willows provided welcome shade.

Paria (pronounced "Par-*ee*" by natives) was one of several hidden settlements started [illegible] Mormon elders called to settle the area for the church. T. W. Smith, Sr., father of one of our guides, was one of the first settlers to farm the region in 1868.

The struggling settlement changed its location several times because of irrigation and drinking-water conditions. Eventually, about 1912, the place was abandoned. Many of the old buildings were still standing, however. We moved in and pushed the pack rats out.

"What does 'Paria' mean?" I asked Tom Smith. "The way you pronounce it, it sounds like the French for 'Paris'."

"It's an old Ute word originally spelled Pahreah," Tom replied. "It means either 'Muddy Water' or 'Water Muddy.' No matter which way you look at it, the stream ain't pretty."

From our Paria camp we made numerous side trips to hidden canyons and remote valleys by pack horse or jeep. One trip up Kitchen Canyon took us past the "Monkey House," built in 1890 by Dock Willis. The house was an odd affair, part cliff and part cabin, snuggled against the base of a huge boulder outcrop (page 395).

When Willis [illegible] was [illegible] years old, he became a [illegible]. Being [illegible], the pet mule the Monkey House famous. He was kept in a small cupola atop a post near the cabin. Whenever he noticed anyone approaching, he would chatter loudly to warn his master.

Woolsey's next-door neighbor, three miles away, was John Kitchen, for whom the canyon was named. Kitchen's cabin still stands, slowly falling into ruin after 60 years of desertion. I found it infested with rattlesnakes under many of the rotting boards.

As a compliment to Kitchen's bride, Molly, early cowhands named one of the most prominent peaks in all of the Four Corners Country for the lady. This sandstone tower gleams white above a surrounding maze of pink canyons and playas of southern Utah.

Although the pinnacle can be seen from the highway across the Kaiab Plateau in Arizona, to reach it requires a pack trip and plenty of time. Near its base we found a gem of blue water called "Nipple Lake" by the few cowboys who had ever seen it (page 392).

It was hard to believe that such a body of water could exist in so arid a land.

Beyond the lake rises a massive white mesa called "No Man's Mesa" because for generations no one was able to climb it. John Johnson told us that eventually he had built a trail to the summit and found good feed there. Ever since, the flat-topped peak has provided a perfect grazing ground that requires no fencing.

In caves near the base of the cliff we found several small Pueblo storage houses along with numerous petroglyphs and colorful Indian drawings. These were among the few signs of prehistoric inhabitants we encountered on the entire expedition. The Escalante Country is a vast, forbidding land, and it was obvious no dweller could survive long in the region.

By jeep we worked out way upstream from Paria to investigate such side canyons as Deer Creek, Sheep Creek, and Bull Valley Gorge. Here indeed, was another Zion National Park. Immense walls of white sandstone overhung us on both sides. The sky became a tiny slit of deep blue.

Desert Storm Sends Expedition Scurrying

In some places the gorge became so narrow that arms could not be extended from both sides of the jeep at the same time (page 391). The cliffs above rose a sheer 2,000 feet. All I could think of was, what a terrible place to be caught in a cloudburst!

On our fourth day at Paria I understood why the early pioneers had been driven out. The weather could play mean tricks. Heavy clouds began to gather in a sky that had been clear only minutes before. A strong wind sprang up.

Above Crossvenor Arch, Gleaming Against the Utah Sky, Waves the National Geographic Flag

[illegible] in honor of the [illegible]

Cars Are the Prairie Schooners, Telephone and Smoke Signals of Indian Days. Now It's a Fleet of Cars, Gas Stations and Freeway Roads.

Grosvenor Arch's Gnarled, Wind-swept Summit Is an Erosion Masterpiece

Escalante Expedition Named This Glorious Valley "Beautiful Valley"

Canyon [illegible] Busy Hunting Scene [illegible] In Nature as Beauty, Called In "Cabrera Pasture"

Remote Gassonville, in Expedition Development Phase, Survives on Irrigated Land in Dry Parts Roop Canyon

The Expedition's Mobile Headquarters Scouts Dry Valley, Broad Sand and Sage Hollows into the Unknown

Following Desolate Paria River Canyon, Mormon Pioneers Took the Lees Road to Arizona

This, too, was no place to be caught in a downpour. In no time the river might rise to a raging torrent ten feet deep and sweep away vehicles, animals, and supplies.

Soon gusts swept through the canyons at express-train speed, stinging our faces with blasts of fine sand. The horses began to get uneasy. Camera cases that were supposed to be dust-proof filled with sand.

All hands scurried to gather up the bedding, equipment, and supplies. In half an hour the pack trains were started down the canyon toward another deserted settlement, Adairville, 10 miles away.

The heavier vehicles traveled a longer trail for the canyon floor was too treacherous with quicksand and possible flooding. The station wagon, carrying delicate camera equipment, was hustled back to Kanab, Utah, into the shelter of a garage to protect the gear from a severe sandblasting.

Wes Parry opened the doors of his superb lodge to welcome us, and once the dusty station wagon was squared away we wasted little time in washing off our spotty "tans" in hot showers. Fresh broiled mountain trout satisfied vigorous appetites, tempered on the trail by a steady diet of beans and fried potatoes. Little wonder that Hollywood folk like Parry for Utah location headquarters (page 385).

By midnight wind and dust quieted down, and early in the morning we fought our way up the "Grumph Trail" to join the horses in Adairville.

Named for its first settler, Thomas Adair, the town was originally settled by Mormon pioneers in 1873 but abandoned in 1878 because of lack of water. It was from this base that we planned to attempt the first trip ever made by automobile to the historic Crossing of the Fathers at Glen Canyon on the Colorado River, some 65 miles distant.

Where Escalante Crossed the Colorado

In 1776, trying to make their way back to Santa Fe, Padres Silvestre Vélez de Escalante and Francisco Atanasio Domínguez passed to the south in Arizona. Near Lees Ferry they began to work their way upstream along the west bank of the Colorado, looking for a possible ford. After days of arduous searching, their scouts informed them that near the mouth of Padre Creek (so named in 1950) they might be able to lead the pack animals to the canyon bottom and cross the formidable Colorado.

Arriving at the designated crossing, later called the "Old Ute Ford," Escalante and his companions were forced to hew steps in the face of the slickrock to enable the horses to descend the steep slope. The Colorado was crossed successfully, and fortunately an easier ascent was found on the other side.

Dr. Russell G. Frazier directed the expedition in 1937 which finally established the exact point where Escalante crossed, and since then a small plaque has been embedded just above the high water level of the river to mark the spot.*

Expeditions that reached this point before us had all been by boat or pack train. Previously, no one had dared to risk a vehicle in this wild country. Soft pink sand dunes, steep and drifting, stretch for miles. Impassable canyons and ledges, hundreds of feet deep, have to be headed or by-passed.

The Jeep Goes Where a Horse Cannot

Guide Tom Smith, who had packed to the crossing several times, insisted the sand was so soft a horse would sink in it up to its belly. Others thought we could get to Warm Creek, 15 miles from the crossing, but would have to hike from there. A few of us remained adamant that a jeep could do anything.

One jeep and the four-wheel-drive truck set out at sunrise one bright morning when it looked as if the weather might hold. The going was easy at first as we followed a survey crew trail up out of Paria River, across Clark Bench, and down into Wahweap Creek.

For miles we drove along the dry stream bed praying it would not rain. In three hours we reached Lone Rock, a gigantic chunk of white sandstone that stood like an outpost near the end of the Wahweap. At its base was the camp of the survey crew, which was working over on the Colorado selecting the site for a huge new dam.

Beyond Lone Rock the trail diminished, and soon we were strictly on our own. The vehicles climbed and groaned up out of Wahweap and across a broad sand plateau. Then they began to slide down the other side into Warm Creek.

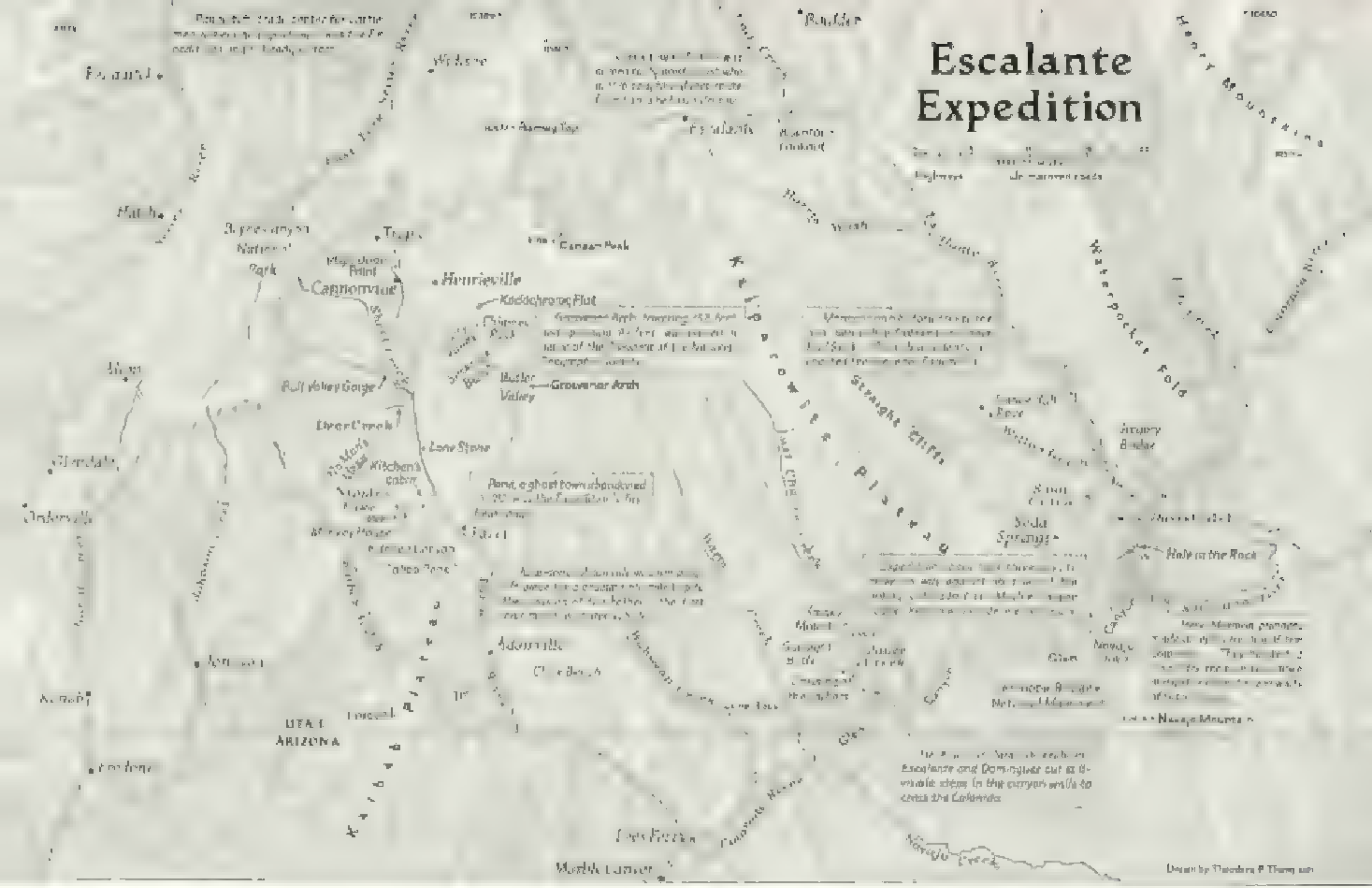
We were now following almost the exact route of Escalante, but I began to think we wouldn't for long. This was no country for an automobile.

The Truck Drops Out of Sight

The truck was about half a mile ahead of our jeep when it suddenly dropped from sight over the rim of a dune. We thought it had rolled off. Arriving at the edge, we found a cliffline slope more than a hundred

* See Map of Southwestern United States, showing trails of early Spanish explorers, issued as a supplement to the NATIONAL GEOGRAPHIC MAGAZINE for June, 1940.

Escalante Expedition



Where Cars Had Never Rolled Before, Jeeps Send Spray Flying as They Plow Across a Rocky Stream Bed

[illegible]

Navajos Dubbed This Colorado River Craft "the Train of the Rock That Goes Over"

[illegible] taken from Art [illegible] Map's [illegible] Expedition [illegible] Where the canoe developed trouble, an craft had [illegible] the craft upriver in a [illegible] place [illegible].

just deep with a crack [illegible] Tuscarora. The truck had plowed right over the top.

Robie Allen had had no forewarning [illegible] just how far that dune dropped, and when he had finally realized the situation it was too late to back up.

From the front seat of the jeep it looked as if we were going to drop right on top of the truck [illegible] was the result.

"How are we going to get back up that dune?" I asked Tom Smith, looking at the towering mass of sheer sand walls on three sides of us.

"When them four-wheeled critters will climb a greased pole," said Tom, looking, nevertheless, a bit concerned.

All hands agreed that this was no time to think about going back. We could worry about that problem later.

On went the cars down the crossing, crashing over boulders, plunging back over stream bed, as high as a house, and driving through knee-deep sand. Near Gunsight Butte the sand began to take its toll. The truck, constantly overheated by the strain, was boiling steadily and began to vapor-lock.

"One stall and we're sunk," said Don Maf[illegible].

In a matter of seconds the truck stalled. Robie Allen pitched right in under the hood to work on the locked engine, while others scurried around on foot to find the hardest sand. Precious water was used to soak rags with which to cool the fuel pump and gas line.

In half an hour the engine sputtered, whirred, and started up again. Hendrix, Alan Chandler, Tom Smith, and I kept several [illegible] the [illegible] up hill [illegible] problem [illegible] punk

Coastal Tourists Squeezes 3,000 Pounds of Gear into Expedition "Headquarters"

[illegible] Old-timers talked of [illegible]

[illegible] parks [illegible] for years.

Once on the crest of this broad plain, we had an easy glide down the other side into another stream bed. Again all I could think of was going back up those dunes!

We inched around the east [illegible] Butte, dropping over three foot ledges, stopping now and then to fill in some of the larger [illegible] with rocks to make it easier for the [illegible].

Several times, while we struggled to hold the car from slipping into some gorge, the [illegible] would tip up on two wheels.

"[illegible] the better the road gets," mused Tom [illegible] as we turned full speed into a trouble-some embankment. He was beginning to feel we might make it.

[illegible] Pabre Creek, which looked impossible to "head," and I thought we'd have to leave the cars and hike.

"Nothing doing," said driver Hendrix, who [illegible] kept like a baby carriage. "We'll [illegible]."

How we fought the jeep through the last five miles is a nightmare none of us wants to remember. I can only recall jumping out several times when it seemed certain the plucky vehicle would roll over into an abyss.

Rocky Road on Edge of Eternity

We conquered grades that would stop a tank, skirted ledges and boulders that tore chunks from the fenders as well as the tires, and bashed the undercarriage unmercifully on jutting rocks.

In an hour we *had* headed Pabre Creek, and before us was a run of only a mile to the promontory where Escalante had dropped to the canyon floor. The car plowed over the sagebrush like a breeze and in a matter of minutes slid to a stop on the brink of Pabre Creek a few yards above its junction with the Colorado.

Local Cowmen Guided the Expedition in Wild Escalante Land

[illegible]

Hunting Rock Souvenirs, She Made a Rich Uranium Strike

[illegible]

Refugees from a Sandstorm Shake the Dust from Their Clothes Outside a Comfortable Lodge in Kansas

[illegible] washed off pretty clean. [illegible] [illegible] Nevertheless, [illegible] the soil [illegible]

Near by was a small rock cairn, built by exploring "river rats" to mark the historic crossing. Actually, Escalante's roughhewn steps were a short distance across the Creek and his final crossing a few hundred yards southeast.

Carrying the flags of the National Geographic Society and the Explorers Club, of New York, the jeep became the first vehicle in history, so far as records show, to reach the Crossing of the Fathers (page 394).

It had been two hours since we had seen the truck, eight miles back, and while we were congratulating ourselves on our feat, we began to wonder when and where the rest of the group had given up. We should have known better. Within 15 minutes, whooping and roaring, the party drove down the slope to the cairn.

It was an unbelievable sight to see these two vehicles sitting on the rim of Glen Canyon at the historic crossing—a point which those few who had been there had thought accessible only by a rugged pack or boat trip.

For almost an hour the group explored Padre Canyon, marveled at the scenery, and examined the actual rock steps, still plainly visible, cut by Escalante in the sandstone. Returning to the cairn, we ceremoniously signed our names on a film wrapper, described our mode of transportation, and buried the document in a tobacco can beneath the rocks.

"I'd sure like to see Norm Nevills's face when he sees these tire tracks up here," commented Don Moffit.

When I met some of the boatmen a few weeks later, they were all wondering how anyone had managed to get a car in there!

Getting Out Harder than Getting In

Getting in had been accomplished. Getting out was something else again. Everyone shuddered at the thought of 11 sandy hills and dunes. The sun was sinking and shadows were long when we started back.

All went well until 8 o'clock. Then we reached the first long stretch of sand. Now by faint twilight we all struggled to fight the cars up the slopes.

Time and again Rollie Allen angled the truck up the slope as hard as he could. Each time the vehicle bogged down to the fenders. Eight men shoved to keep it moving. Even the jeep slithered helplessly in the churned-up sand.

Each run, however, brought the truck a little closer to the top of the grade. After an hour of trying, we conquered the first slopes.

We now discovered we had burned out the battery in the truck and the generator in the jeep. Flashlights would have to light the trail. In the darkness we fought the cars back toward the mouth of Warm Creek, where the worst dunes waited.

Could we make it? Or would the cars be abandoned to the drifting sands of the desert?

First, the truck tackled the almost sheer dune. Men were stationed in pairs every 20 yards to grab hold and push.

Up and Over a 200-foot Dune

Allen backed the truck as far across the bottom wash as he could for a running start and hit the dune full throttle. He came ahead so fast that no one had a chance to push. To everyone's amazement, the truck never faltered and cupped the 200-foot dune unaided.

On the jeep's first attempt it hit a hidden boulder and slid off the side of the embankment. All hands shouted and lifted to put the car back on course. Then it, too, zoomed over the dune.

Tom Smith cheered us once more with his now familiar comment that "the farther you go the better the road gets!"

From Warm Creek on there was little difficulty. By midnight we made the Survey camp at Lone Rock and bedded down. At sunrise quick repairs were made on the cars, and on we went into Adairville.

Never had the comfort and convenience of my station wagon been so welcome. In no time the gas stove was blazing on the tail gate and hot cereal and coffee were being devoured by all hands.

The superb drivers of the truck and the jeep, Rollie Allen and Burnett Hendrix, deserved a special breakfast. Thanks to them, we had made it to the Crossing of the Fathers—and back!

Bisecting the 10,000-square-mile area of the Escalante Country is a long, slender tableland called the Kaiparowits Plateau, which runs southeasterly for nearly 60 miles from the town of Escalante.

For the first few weeks our Escalante Expedition had been concentrating its field work to the west and south of this massive promontory. For the second half of the field work our base camp was moved to the north side of the Kaiparowits near the end of the mesa at Soda Springs.

Here rancher Clark Veator of Escalante had set up a tiny log cabin at the mouth of a natural rock corral (page 396). All feed and supplies were trucked 60 miles down the rugged trail from Escalante, a verdant oasis with a town of 1,100 people, named in honor of Father Escalante.

Forty miles below Escalante, on the trail to

In Earth's Age-old Battle with the Elements, Great Chimney Rock Stands Unchanged

In This Natural Amphitheater "Sun Dun Stone" is a Heroic Figure, Dressed by the Light of a Desert Moon

"Pretzenpole!" "Ladies Choice" Dance Hall Rock Echoes a Mountain Music and Dancing Festival It Did 70 Years Ago

In Treacherous Paria Rock, Carson, Expedition's Scouts Probe a Quicksand Trap That Foiled Its Big Tilton Stude. Jeep

Powerful Four-wheel Drive Takes Slot for Gorges or Inland Stream Beds in Spring

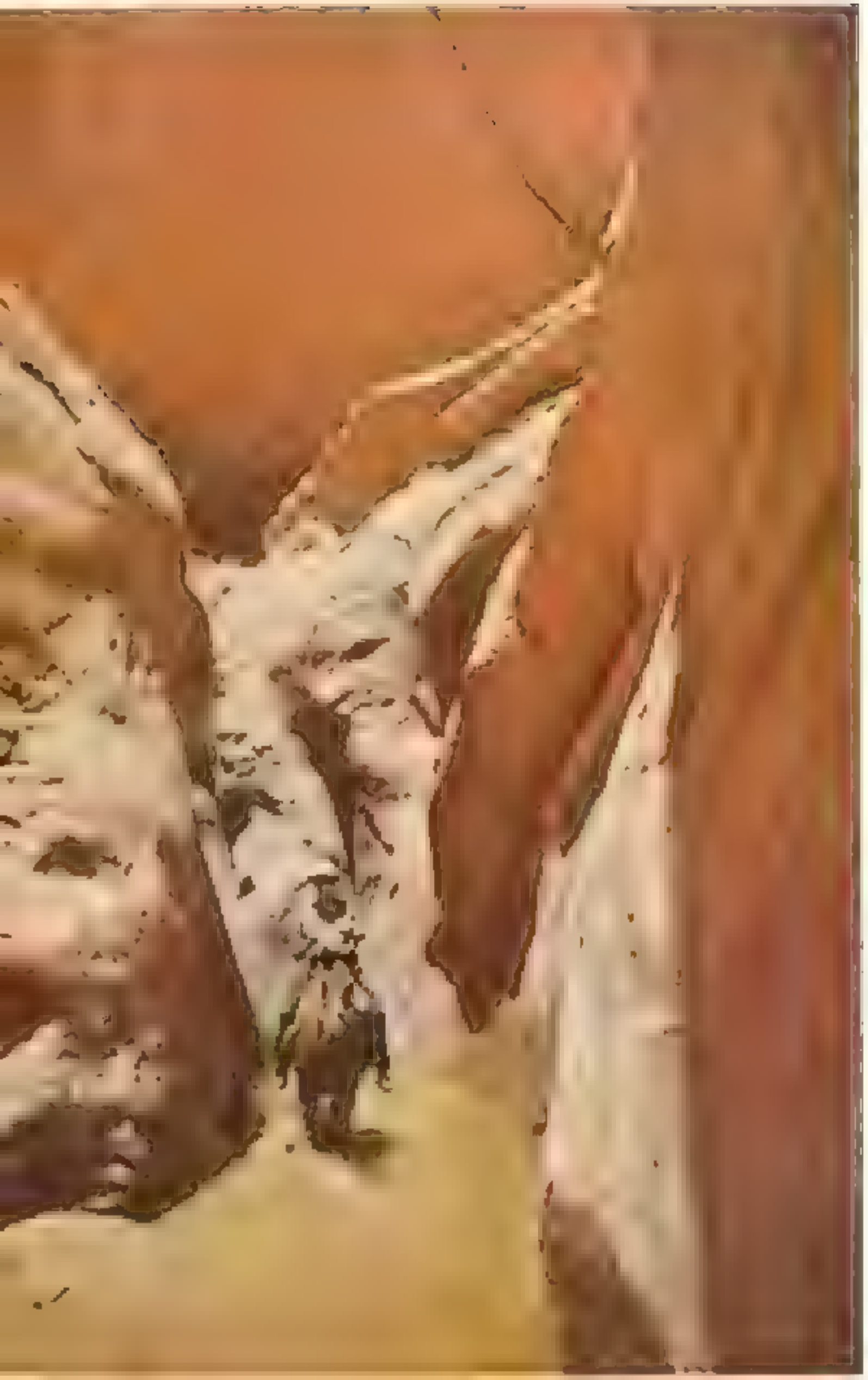
Area 1 – Sand and Dust of Pecos Canyon, Mesa and Horses Found Hidden Square Case on Explorer's Beach

[illegible]

No Architect Ever Fitted a Home into Its Surroundings Better Than the Builder of This Colonial Hut

Desert Vacation — a Jeep Makes Exploration History by Bringing to the Colorado River's Historic "Crossing of the Fathers"

[illegible]



Natives Walls and Deep Water Thousand Engineers in Negotiations South French

[illegible]

[illegible]

[illegible]

Snugged into Tree-worn Cliffs, Base Camp at Soda Springs Looked Like a Ready-to-Use Hideout in a Hollywood Western

[illegible]

Once a Handful of White Men Had Seen This View of Rounded-Shouldered Navajo Mountain, Home of an Indian Thunder God

From Boynton's Lookout the Author Photographs the Grandeur of Escalante Canyon

Top Below, Clan Chiefs Split into Separate Escaping Rivers Beside a Highway Bridge

[illegible] Shifting Scrubdrifts
"Gibbs Peak" Weeps
[illegible] Stand
of Ponderosa Pines

Stocking Up After Colorado Was a Three-Hundred-and-Four Grand

Exploring Utah's Rugged Beauty: Places to Motorcycle Courses

Through Historic Hole in the Rock Mountains Opened a Path to Their Promised Land

Soda Springs, we passed a huge natural rock amphitheater called Dance Hall Rock (page 388). In the '80's Mormon pioneers camped here with their families en route to Hole in the Rock. By the light of a desert moon they danced nightly on the smooth sandstone to the music of Sam Cox's fiddle.

Our many friends in Escalante, some dressed in the actual costumes worn by their grandparents 70 years ago, gathered together one Sunday and trucked down to the rock. With the aid of a three-piece orchestra the happy folk re-enacted for us the dances performed by their ancestors.

Dance Hall Rock Comes Back to Life

For several hours the rock amphitheater came back to life and echoed to the cadence of clapping hands, cheering voices, and the rhythm of the banjo (page 389). Then at dusk the Mormon families climbed back into their trucks for the 40-mile jaunt home. The expedition went on to camp at Soda Springs, and Dance Hall Rock returned to its isolated quiescence.

At Soda Springs our group split up into several sections to tackle the many projects we contemplated in the area. Art Greene and Earl Johnson, from Marble Canyon Lodge in Arizona, were to meet us at Hole in the Rock, on the Colorado. They were bringing a boat upstream 80 miles to pick us up and take us by water to the mouth of the Escalante River.

Greene's job was not an easy one. In the spring the Colorado is a raging torrent, swelled by melting snows and spring rains. Sand waves six feet high are likely to rise suddenly and swamp a craft.

The overland party set forth in jeeps to drive to historic Hole in the Rock to effect the meeting. It was about like the trip to the Crossing of the Fathers all over again. Miles of soft sand, gnarled sagebrush, and deep washes had to be traversed. It took half a day to cover the eight miles from our camp at Soda.

In 1879 the Mormon Church sent a group of hardy pioneers to settle the valley of the San Juan, an isolated tributary on the east side of the Colorado River near the Arizona line. [illegible] Salt Lake City. In late fall, the band of 256 persons toiled up the Sevier River to the settlement at Escalante, then continued along the base of the Kaiparowits to Soda Springs.

Advance scouts had reported that the party might be able to lower horses and wagons through a narrow slit in the rim of Glen Canyon to the bank of the Colorado, where a ford could be made.

The slit, which came to be known as Hole in the Rock, turned out to be only ten feet wide in places, with a drop of more than 1,500 feet! The story of how the Mormons conquered this canyon is one of the classics in the history of the West (opposite page).

Heroic Saga of Hole in the Rock

Camping on the rim in December, 1879, the men began to blast the Hole larger and cut steps to the bottom of the sheer precipice. The women [illegible] hard activity, while the older men melted snow for water. Four weeks were spent in constructing the "road" through the Hole.

On January 26, 1880, a third of the wagons were lowered to the Colorado and floated across. To make the descent, some wagons had as many as 16 braces of oxen tied to the rear to act as a brake. By February 10 the last of the wagons had crossed, and women, children, and animals soon followed.

The pioneers continued eastward, overcoming almost unbearable hardships on the other side, and six weeks later arrived in the San Juan Valley to settle such towns as Bluff, Blanding, Monticello, and Mexican Hat. Their tortuous trail through the Hole in the Rock had evidently never been used since.

We modern pioneers of the Escalante Expedition [illegible] lugging drums of gasoline and oil for Art Greene's boat. As we descended the precipice, I could not help marveling at the persistence of the Mormons. In many places the drop between steps exceeded 20 feet. The coarse and jagged boulders could tear a person's clothing to shreds in the first few yards.

Hendrix, Kel Cameron, and I made two round trips through the Hole, searching for Art Greene. On the second trip we found him. His boat had been badly buffeted by the severe current, and it had taken him three days to cover the 80 miles (pages 382 and 401). Later, on the return trip, he made it in less than eight hours!

We fought the current with a full boatload up to the mouth of the Escalante, where we set up a small camp. In short order Kel Cameron was reeling in catfish for supper.

Backtracking Through Hole in the Rock

The mouth of the Escalante proved too shallow to admit a boat and its bottom too treacherous with quicksand to permit us to enter on foot. Our only alternative was to backtrack up through the Hole and enter

* See, in the NATIONAL GEOGRAPHIC MAGAZINE "Desert River Through Navajo Land," by Alfred M. Bailey, August, 1947.

Escalante Canyon overland through one of the side gulches.

We had heard tall tales about many natural bridges and arches that supposedly were hidden in the numerous tributary canyons of the Escalante. One of our major objectives was to check the veracity of these reports, especially those that claimed the existence of bridges greater than the famous Rainbow itself.

By foot and horseback we explored each canyon carefully. One group packed down Davis Gulch, only to be driven out by a wild bull that was hiding in a narrow glade.

Nightmare in Soda Gulch

Moffitt, Kel Cameron, Hendrix, and I tackled Soda Gulch, through which, to our knowledge, no man had ever passed, and almost ended the expedition right there.

Five miles from its head the canyon narrowed to only four feet. Water was pocketed between sandspits. For a while we thought we might get the horses past when suddenly Don Moffitt's mare broke through the gravelly surface into quicksand up to her belly (page 395).

Prompt coaxing on Don's part saved the horse. The rest of us urged our animals past the pitfall as best we could, but it was obvious this was no place for a horse.

Tying the animals to shady trees in a wide bend in the canyon, we continued afoot downstream.

The walls became narrower and rose more than 800 feet. The trickle of water we first encountered became squeezed to a depth of three feet, then four, and finally it was over our heads. One camera or piece of equipment after another was left behind on projecting rock shelves.

When the water topped our heads, Kel Cameron preferred to "bridge it" through the gorge, bracing his hands on one wall and his feet on the other (page 395). One slip would have meant a bad smashing on the rocks as well as a cold ducking. I put my Leica under my hat and with Hendrix ventured the cold swim.

Hours of this rugged hiking failed to disclose anything more than small windows and arches. A few hundred yards from the junction of Soda Gulch and the Escalante, however, there is one bridge—a massive affair called Gregory Bridge after Dr. Herbert E. Gregory, who is credited with finding it. But it is no Rainbow.

On a separate pack trip Don Moffitt explored Willow Gulch and the center section of Escalante Canyon. Again small windows, arches, and one bridge were found, but nothing to bear out the claims we had heard.

In talking with ranchers who range cattle in this desolate section, we soon realized that no one could claim discovery of any of these features. The Mormons have known about them for generations. True, few people have seen them, and few ever will. It will take a long time, however, and a lot of looking before anyone finds a feature to compare with the size and symmetry of Rainbow Bridge, the 291-foot length of Landscape Arch in Arches National Monument,† or the gleaming beauty of Grosvenor Arch in Butler Valley.

By Pack Horse to a Mountain Eyrie

Our final sortie on the Escalante Expedition was by pack horse to the end of the Kaiparowits. This is another point few more than a handful of men have ever reached. The trail was steep, the water scarce, and the heat almost unbearable. But the vista from the top of this 60-mile mountain was worth every effort (page 397).

Two thousand feet below us lay ruddy Navajo Canyon. To our right was the Crossing of the Fathers; to the left, Waterpocket Fold, Escalante Canyon (pages 398-9), and the Henry Mountains. Right in front of us loomed the west face of Navajo Mountain and the gnarled maze of red canyons that debouch into the Colorado River below Rainbow Bridge.

This was the Escalante Canyon—vast, wild, forbidding. Agriculturally it is a wasteland, devoid of water or vegetation. For the geologist or the explorer who likes to get as far from the beaten track as he can, it is paradise.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Exploring Navajo Mountain with a Pack Train," by Charles L. Bernheimer, February, 1935, "Great Rainbow Natural Bridge of Southern Utah," by Joseph P. Foster, November, 1911.

† See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Utah's Arches of Stone," by Jack Breed, August 1947.

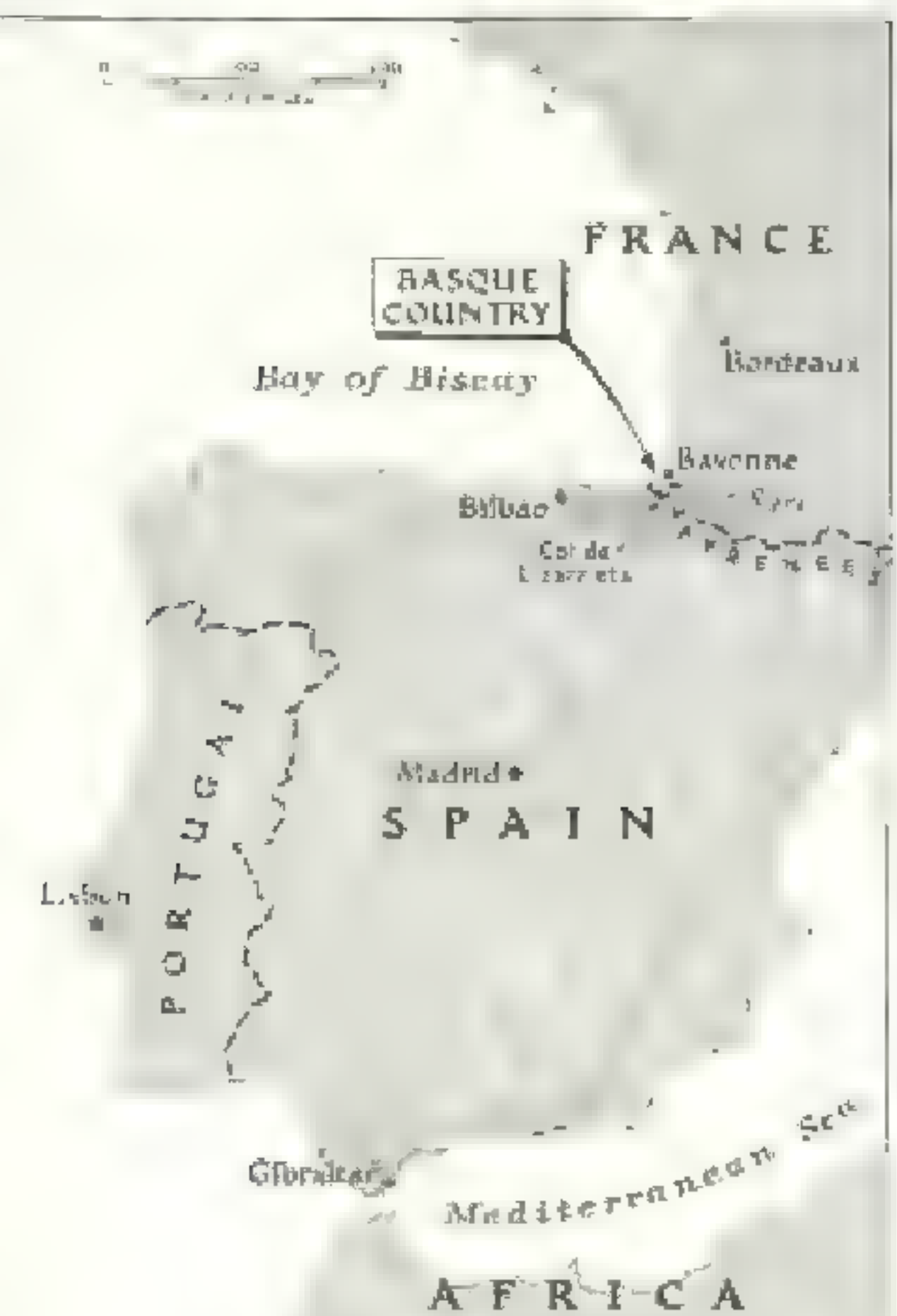
[illegible] *address not later than October first. Be sure to include your postal-zone number.*

Pigeon Netting—
Sport of Basques

Snapping a White Cloth Decoy, a Basque Guides Migrating Pigeons Toward Nets Below

[illegible]

Wooden Disks Hurled Skyward Simulate Famous Steer Pigeons Earthward



Watchers Hidden in This Camouflaged Tower Sound the Cry as the Pigeons Approach

Posed Like Passing Servers, Hurlers Stand By To Launch *Zenkaies*. The Longshoulder Club Whip Crooks Like Centre When Snapped

Lines Hasten To Collect Their Different Bags; the Next Flight May Follow Soon

Sporting Rights Belonging to Those Twelve Homesteads Scattered over These Western Pyrenees

[illegible] settled [illegible] between 2000

Migrating from the North, the Pigeons Fly Through This Pass Round or Warner Canyon

[illegible]

Tunnel Never for Sheets of Advancing Blocks Hunters Work Away Between-times Waits with Corn Patching

[illegible]

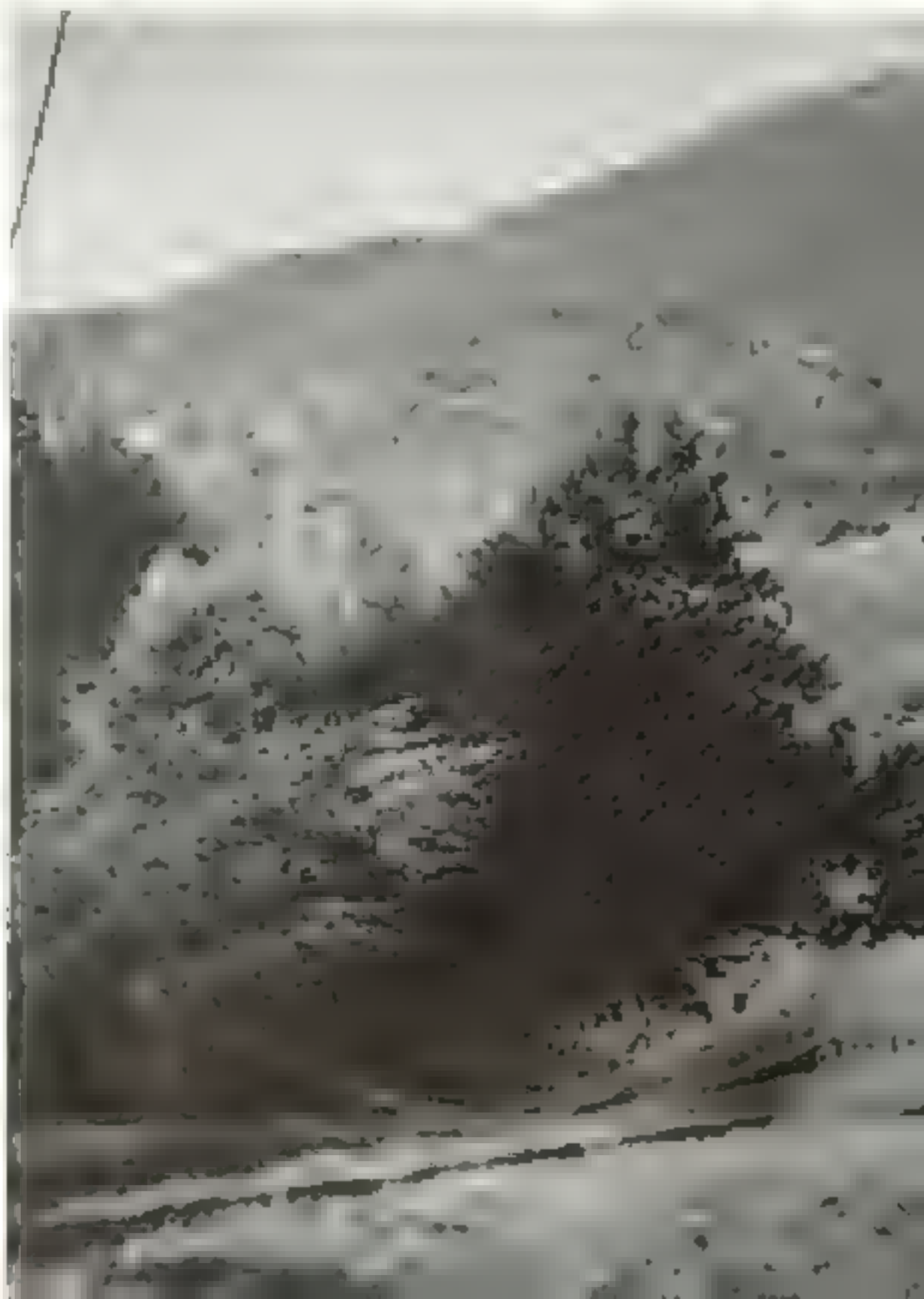
Big Aprons, Eyeglasses for Dressing, Can Hold a Score of Birds . . . Basque Priest Is a Crack Marksman

Hump Pigeons Will Soothe the Gourmet's Palate in Fashionable Parisian Cafés

Hot Political Arguments, Featured by Waving Hands, Spice Waiting Periods

At Dick's and Field Hunters Await Clients Division at "Headquarters Hut"

Hunters Must Inspect and Repair All Sets Before Trudging Homeward



Like Flies in a Spider's Web, Pigeons Are Trapped in a Basque Net

The mesh flares out as the birds hit head on. Entangled in the silken folds, the [illegible] fall [illegible] to the ground. For every pigeon snared [illegible] the [illegible].

Cruise to Stone Age Arnhem Land

By Howell Walker

With Illustrations from Photographs by the Author

"UNSEAWORTHY," said a man in [illegible] ships. "Unsound, I say. What's more, she's slower than a turtle."

From the ashes of conflagration, however, the *Phoenix* rose and put to sea. The 200-tonner, built like a barge, cruised at 4 knots, a fast walk under fair conditions. Older than a century, she managed her years with stubborn scorn for wind or tide; and, in this land of wait-a-while, she showed aboriginal disrespect for time.

If schedules meant anything to her or to north Australia, the *Phoenix* left Darwin 20 days late for Groote Eylandt. Ahead stretched almost 700 miles of fickle seas and weather (map, page 421). Estimated time [illegible] she had not.

The calaboose bark carried seven passengers, handled supplies for isolated mission stations, and hauled scientific equipment, camping gear, and food for the Arnhem Land expedition already weeks awaiting her at Groote.*

Three of us aboard the *Phoenix* followed 14 other expedition members who traveled by air. Dr. David Johnson and Herbert Deignan, both of the Smithsonian Institution, in Washington, D. C., collected animals and birds. I accompanied them on the sea voyage.

Among the crew of eight, Skipper Tom Echelby owned the bark and ran her Diesel engine; Jim Johnson was cook, dishwasher, matelot, and boatswain; six natives worked as needed.

Visitors Scarcer than Food

In her own time the *Phoenix* barged northeast through Clarence Strait. As if standing still, we took a whole day to pass Melville Island. Toward Cape Dupuis's beacon on Coburg Peninsula our helmsman steered half the night.

There is a singular dearth of lighthouses on Australia's north coast. Despite hazardous reefs, hidden sand bars, and treacherous tides of deceptive depths, there are none between Cape Don and Groote Eylandt.

At our first port of call we anchored off Croker Island's mission station. Natives secured a long heavy rope to the ship's stern and took the loose end by dinghy to a scow 100 yards away. Six men on the lighter tugged in unison to draw alongside the *Phoenix*, then black backs sweating under the hot sun off-loaded food and building material.

Croker Island mission, established early in 1941, receives half-caste orphans between the ages of 3 and 19. Most come from Darwin and vicinity. At present a staff of 7 is training 75 boys and girls for useful jobs in later life.

Rupert Kentish and his wife invited some of us to lunch at their house and graciously offered use of their shower bath, a novelty foreign to the *Phoenix*. They were glad to see us, for the only boat from Darwin with mail and supplies arrives at 10-week intervals.

"Visitors are scarcer than food," Kentish said when we tried to thank him.

To support her husband's words, Mrs. Kentish produced a guest book, on three pages of which were signatures of all visitors to this mission since its beginning.

I counted 60 names, in nearly 8 years'

To supplement rations from the outside world, the mission cultivates fruits and vegetables, raises cattle, goats, pigs, and chickens.

In well-kept gardens we saw pawpaw (papaya), pineapple and African quince, mangoes, custard apples, oranges and limes, sugar cane, watermelons, pumpkins, peanuts, sweet potatoes, string beans, corn, cassava, and even cotton.

The key to Croker Island's cornucopia was water—lots of it. As Tom Echelby said, "Croker floats on fresh water; you dig down only a few feet to find it."

Rupert Kentish dug in. He did just about everything around the mission except make it rain. Using wells and plenty of pipe, he irrigated the garden efficiently.

Unloading cargo lasted all day. Kentish stuck to the task, laboring harder than any black. And that night he rowed out to the *Phoenix* with two large crates, one holding five pigs, the other five hens and a rooster.

We stowed the livestock on the bow and set course for South Goulburn, 70 miles to the southeast.

Dead against an increasing wind, the *Phoenix* fought a losing battle. Less than halfway

* A full report of his Commonwealth of Australia-National Geographic Society-Smithsonian Institution expedition to Arnhem Land, northern Australia, will appear in an early issue of the NATIONAL GEOGRAPHIC MAGAZINE. Its object was to study and photograph the Stone Age aborigines of this little-explored area east of Darwin and its animal, insect, plant and marine life. The author, a member of the NATIONAL GEOGRAPHIC staff, accompanied the expedition as writer-photographer.—Editor.

Off Australia's Famous Storm Coast, a Storm Hurls *Phoenix* on an Uncharted Reef

The hull was holed and her keel damaged when she ran aground in Bowcaut Bay, en route from Darwin to [illegible] and with Arthur Land on [illegible] condition [illegible]. The reef was backed away on an attempt to [illegible] were [illegible] high tide to float the craft, passengers and crew [illegible] swam, and chipped ashore [illegible]. The [illegible] tried vainly to convert a radio receiver into an SOS transmitter. On the fourth day *Phoenix* was freed (page 423)

[illegible] to take shelter behind Cape Cockburn.

At daybreak the gale continued. We did not try to argue with it. Most of us welcomed the opportunity to explore the beach sweeping up to red cliffs and pandanus trees backed by low, dense jungle. It all represented much of the coast so far seen.

Johnson and Dreman set out to collect specimens. Some of us wandered along the strand, finding curious shells, pebbles, crayfish, and water-buffalo tracks. Our six native crewmen foraged for turtle eggs, found 159 of golf-ball size, ate 159, and went to sleep on the sand.

Noah's Ark, 1948 Model

In the afternoon *Phoenix* tried to round Cape Cockburn. Wind and sea struck beam on. She rose, fell, heaved, rolled, lurched and spanked her flat bottom hard. Everything shuddered; the biggest beams creaked, smaller ones cracked. Decking danced like keys of an automatic piano; the propeller racced in air.

We had to turn back.

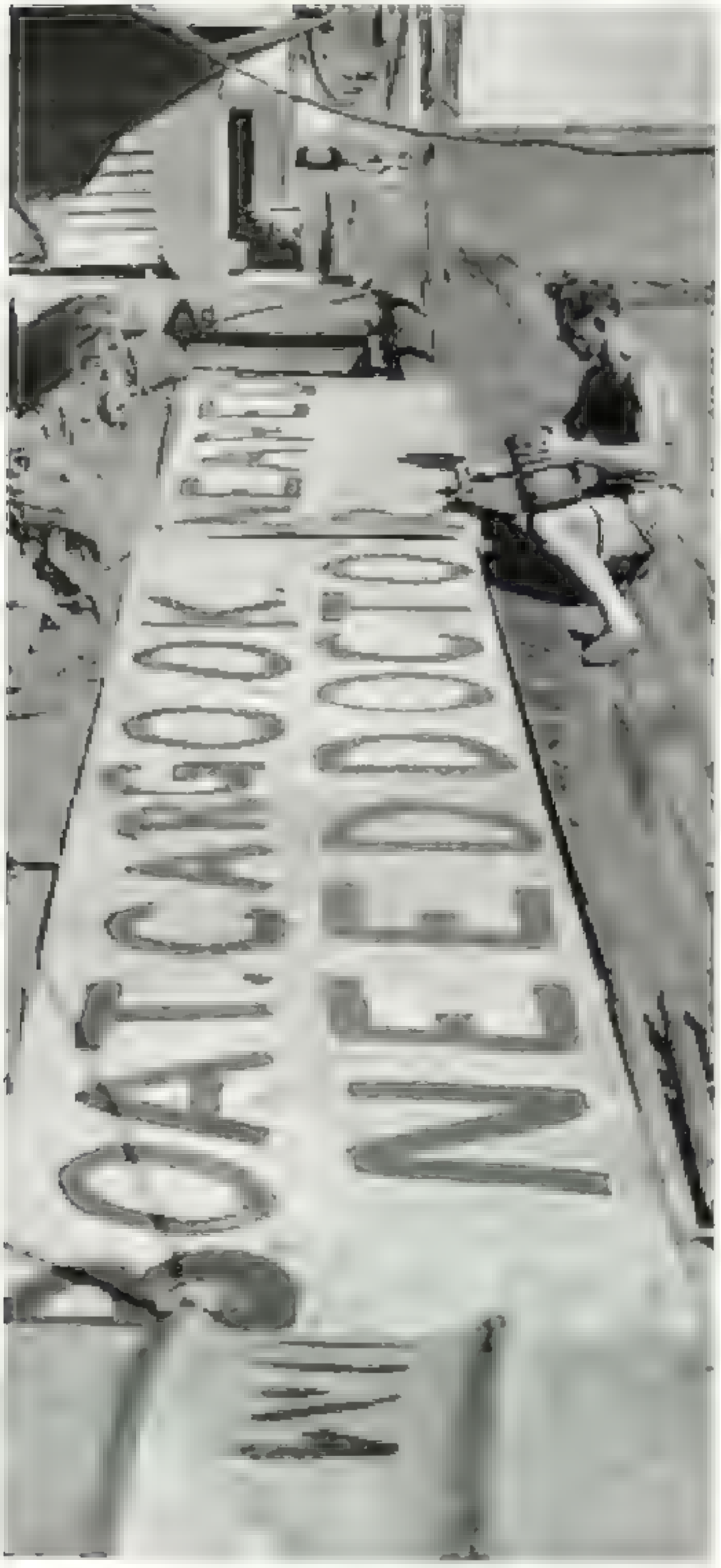
In many ways, of course, the *Phoenix* failed to measure up to Noah's Ark. Still, pigs and chickens lived on her bow. Bird, animal, reptile, and bug collections increased with every visit ashore. Lines over the side brought fish aboard.

Several natives occupied the forepeak, directly under the livestock. Some aboriginal crewmen slept, and all ate, on the after hatch cover. Each of us had just enough space to lie down.

The only above-deck shelter stood shakily on the stern. Nailed or unnailed wooden [illegible] roofing. Here, in an 8-foot square, were pilothouse, bridge, cookhouse or dining room, captain's cabin and boatswain's berth, washroom, woodshed, water reservoir (page 424).

White Men's Hard Luck Brings Tinned Riches to Stone Age Aborigines

[illegible]



On Pleasure's Deck He Paints a Plea for Help

This message lettered by boatsw[illegible] Jan Johnson failed to [illegible] passing aircraft to the stranded ship. A doctor was need[illegible] [illegible] injured crewman. A [illegible] only after natives paddled [illegible] a [illegible] station with an appeal to be rescued to learn

Not [illegible] lack but the nature of the water aboard matter. [illegible] Two large tanks on either side of the [illegible] burning stove held a total of at least 500 gallons. Without faucets, one [illegible] dipper, with a mug or pitcher [illegible]

At first I just didn't dr[illegible] water, but thirst soon defeated discretion. Like everyone else, I closed my eyes and drank.

Jan Johnson cooked for all, the alcoholics included. The meals' chief element of surprise lay in their irregular hours. I [illegible] called us to breakfast any minute between 7 and 10; we lunched at noon or 3 o'clock; the evening meal came at 9:15 one night, 6:30 another.

Tobacco Is Standard Currency

When we arrived at South Goulburn Island, the mission there had been on starvation rations for ten days. Nearly three months had elapsed since the last supply ship called in.

Weeks without any tobacco upset the natives most; women as well as men cherish it more than food. It's standard currency in the Northern Territory, as wages for work, sticks of "nuggety [illegible]urky" (cut plug) best satisfy.

Well before unloading began, a dugout canoe drew up to the *Wooruz*. Three hungry-looking blacks clambered aboard. They didn't beg for food; they couldn't wait for their tobacco to go through usual channels. Only the appearance of Mr. Ellison, the missionary, dispersed others approaching.

The mission had no jetty, no barge or lighter, not even a raft. All heavy supplies went ashore in the dinghy and dory. Native agents took what they could. I reached the beach on [illegible] of bagged flour.

[illegible] Goulburn, wearing [illegible] clothes), looked a[illegible] [illegible] nourished. Yet there [illegible] pound sa[illegible] [illegible] from surf to [illegible] 250 yards awa[illegible]

To Arnhem Land Scientists Voyage To Study Australia's Aborigines

The red arrows mark the course of the supply ship *Phoenix*, which carried three members of the Commonwealth of Australia National Geographic Society-Smithsonian Institution Expedition from Darwin to Groote Eylandt. Stops were made at missions, indicated by smaller green arrows. Here live 5000 Stone Age people.

Their wives appeared healthier and better fed. They had straight backs and bare breasts firm as pawpaws. Whether or not one carried anything, she walked as if a tray up balanced on her head. She even faced gracefully

[illegible] the girls of Adelaide a couple of things in uplift [illegible] remarked one of the Australian passengers.

Along a palm-lined lane we walked to the [illegible] homestead and met Mrs. Ellison. [illegible] invited us to stay for lunch.

Before the meal Ellison banged an iron cylinder hanging from a tree outside the storehouse. Dusky men, women, children [illegible] popped up with empty pails, cans, or baskets. As they filed by a window, the missionary issued each flour and dried raisins. One old man who didn't have a receptacle large enough for his rations took off a Tyrolean hat to catch some. Waiting patiently in the queue, a woman puffed on a pipe, once a crab's claw.

Ellison showed us inside the storehouse before natives began stacking supplies. It looked bare as Mother Hubbard's cupboard.

The Ellisons had three children: a girl of three years, a boy about two, and a five-month-old baby. The older two seemed well, but the youngest, who cried constantly, obviously suffered from malnutrition, skin hanging loose on its 7-pound frame. The nearest hospital was in Darwin, 200 empty miles away.

The missionary told us that extra heavy rains in February and March had destroyed most of his garden crops. Other edible plants, however, grew wild and thrived on the island. These, along with fish, crab, turtle, lizard, and opossum, would have kept the mission's 240 natives and white family alive had the station run out of other food altogether.

During the prolonged tobacco dearth at South Goulburn, aborigines had persistently quizzed Ellison, trying to catch him up by [illegible] leading questions. They stood outside his house for hours at a time, shouting for nicky-nicky and throwing stones on the tin roof.

All day two boats rowed back and forth between the *Phoenix* and the beach. All day emaciated-looking but tireless natives moved loads from surf to storehouse.

My strongest impression of South Goulburn Island was the will with which the men worked. In single file like ants they carried burdens often heavier than themselves; and they always returned for the next bundle and formed another caravan.

But the motivating force behind this picture was tobacco; only nicky-nicky could draw such lines (page 422).

From South Goulburn Island the *Phoenix*

A Woolly Elder of Arnhem Land Puffs His Crocodile Pipe

[illegible] than 200 black aborigines, he lives [illegible] and three children [illegible] Arnhem Land [illegible] will [illegible]

entered the wild open Arafura Sea. Swells [illegible] about her [illegible] of [illegible] sand. W[illegible] the bow [illegible] shrapnel over the deck and [illegible] the lee of Cuthbert Point.

Phoenix Hits a Reef

With darkness myriad mosquitoes attacked. We retired early for blanket cover.

Before I fell asleep, I listened to the native crew singing below and watched a big moon rise and hide behind [illegible]

Night [illegible] its glamour when [illegible] to glimmer. That [illegible] dazzling heaven

the [illegible] in the bird.

Again we ventured into the Arafura and [illegible] restless [illegible] but the *Phoenix* [illegible] in the [illegible]

At sundown storm [illegible] massed in the [illegible] front of torrential rain [illegible] us with [illegible] wind and [illegible] *Phoenix* [illegible] Bay.

Night [illegible] we could [illegible] the bottom. Then [illegible] cried out:

[illegible]

[illegible] thun[illegible] the *Phoenix* [illegible] and [illegible]

[illegible] snapped [illegible] the reef. The engine [illegible] often spinning in the [illegible]

On the anchor chain the *Phoenix* [illegible] the *Phoenix* [illegible] of the [illegible]

Suddenly the [illegible] too fast, and slipped [illegible] feet. In the dark confusion [illegible] caught his hand in the [illegible]

Without a [illegible] over him [illegible] of a hand. Two fingers were [illegible] third dangled by a single tendon.

Arnhem Style Note: Noselines Are "Plunging"

Aborigines' fashions, like their dialects, vary in different localities. This young woman, like most others of Elcho Island, wears nothing from the [illegible] The island's 200 natives call the Australian Methodist missionary [illegible] "mother."

[illegible] everybody on [illegible] Phoenix stopped what he was doing to give undivided attention to the injured boy. I watched his face while he [illegible] Vanishing calm, [illegible] looked as if he [illegible] jewelled hand [illegible] were some detached object.

At the Mercy of Wind and Wave

To the *Phoenix*, now at large, wind and sea gave no quarter; the hurled her like a [illegible] log back upon the reef. There she lodged with an air of finality and [illegible] forward quarter [illegible] sed safely on the rocks (page 418).

We spoke of floating her off on the next tide, but dared not to think of a [illegible]-pounding storm that might take her apart plank by plank.

To lighten the [illegible] which seemed to [illegible] from the reef, we shifted cargo forward. Passengers and crew, white men and black, sweated at this work in hell-hot holds.

High tide, however, wasn't high enough. It [illegible] the *Phoenix* froze hard and [illegible] She didn't budge; she bent like a [illegible] crew.

[illegible] reef formed the rough circumference [illegible] shallow lagoon a fathom or [illegible] Once the most generous tide [illegible] she sat on the low-water end of a fortnight's tide table. The [illegible]

[illegible] the *Phoenix* [illegible] Overboard went tons of corrugated iron, the [illegible] lowed. Many cubic feet of tin-boxed biscuits (crackers) bounced in. Whole cases of canned foods also splashed.

As hours turned into days on the reef, concern for Fred's hand naturally increased. [illegible] Dawson of our [illegible] need of a doctor.

The *Phoenix* had no radio of her own, but we found a receiving set among the cargo. [illegible] Melbourne. Melbourne [illegible] nearest mission station.

[illegible] None knew more than that [illegible]

High and Dry on the Beach *Pioneer* Off-loads Cargo Like a Navy LST at Low Tide

[illegible]

[illegible]

[illegible]

[illegible]

Elgin Island's Younger Set Turns Out for an Infrequent and Exciting Event—Arrival of the Supply Ship

[illegible]

where in the Arafura Sea, between the Goulburn and Crocodile Islands.

Naturalized nomads of this remote land of never-never first spotted the stranded vessel and paddled out to us from the shore of Bougainvillea Bay. Tobacco they wanted, of course; but our skipper struck a bargain. They left for Milingimbi, 40 miles away, with an urgent message and the promise of sticky-sticky on return (page 429).

Shortly after our messengers left, another dugout arrived with more visitors from the beach. These so-called Stone Age men certainly knew tin when they saw it—even on the ocean floor. They salvaged a dugout load of canned food jettisoned from the *Phoenix* (page 419).

At first we welcomed aboard our shore neighbors. We liked to photograph them, trade tobacco for tortoise shell, living crabs, or fresh fish. But the novelty wore off as our capital swindled and flies multiplied by thousands. Each caller from land carried an insect plague on his naked back.

Morale-destroying Events

One day at lunch someone shouted, "A plane."

Everyone scrambled to watch an approaching Catalina, hopeful that help was arriving. The flying boat could take Fred into Darwin's hospital and report our position.

Apparently seeing out a landing place free of reef, the aircraft flew so low and close we could see the faces of its crew. But it merely tantalized us for five minutes and departed.

No one finished the interrupted meal. Slowly Fred sat down, expressionless as ever, his back to a white-hot sun that glared in the north.

Next morning we listened to radio conversations held regularly between Darwin and coastal stations. East of us Milingimbi, Elcho, Yirrkala, and Groote still counted on the overdue *Phoenix* for food, mail, and other supplies. Most of their talk centered around the missing craft. We laughed at their guesses.

Then a cryptic announcement from Darwin utterly amazed us: "Launch *Phoenix* sighted on reef at position 134° 17′ E.—11° 52′ S. *Phoenix* caught by surprise; apparently deserted, crew probably walking along beach toward Milingimbi."

Such confusion might have amused us could we have talked back; but the thing lost its humor with a man's hand and his life at stake.

Broadcasting from Melbourne, Radio Australia mentioned our awkward circumstance, but expressed "no fears for their safety."

Mission stations had enough imagination to presume our possible need of aid. By radio they planned among themselves to investigate our situation. A small airplane on Elcho Island offered a reconnaissance flight.

Anticipating the plane's arrival, Dreiman and Johnson labored on the reef at low tide. Bucket by bucket they hauled white sand from beyond the rocks and with it formed large letters to spell "NEED DOCTOR—INJURY."

Later we learned that one of the missions radioed Darwin, requesting a relief ship to stand by the stranded vessel. Official word came back: *Phoenix* and personnel O.K., capable of helping themselves, require only time and tide to see them through.

So the missionaries scrapped their plans and the proposed flight from Elcho. Incoming waves washed away an afternoon's work and hope on the rocks. Fred's hand got no better.

The sun left a cloudless sky. An orange glow yielded to darkness. The same planets in the same place looked down on the same craft in the very same place. Another night on the reef lay ahead.

Life on a stranded vessel, however, wasn't all disappointment or a test of patience. We fished, chipped oysters off the ironstone, or went swimming. Sometimes we made excursions ashore to collect fresh water, firewood, and crabs. Once a couple of our crew in a borrowed dugout harpooned a 300-pound green turtle (opposite).

They Mentioned The Geographic

Radio brought us news of the great world outside our little lagoon. Without the slightest compunction we eavesdropped on the missionaries' informal conversations. We heard Darwin notify Mr. [illegible] the National Geographic Society was overdue. Ellison explained that he had already paid. Another missionary interrupted abruptly; he wanted the extra membership!

One morning the radio revealed our native messengers' arrival at Milingimbi. Darwin soon dispatched a rescue plane.

We last saw Fred disappearing into a Catalina. Of him we heard only once afterward. He ran away from the Darwin Hospital—just went "walkabout."

For the skipper, time and tide came too slow and too low. He approached the *Phoenix*'s problem from a new angle. For two days he led crew and passengers with pickaxes, crowbars, and sledge hammers in the back-breaking work of tearing away the reef under his helpless vessel.

Finally, in a higher tide than usual, the

Phoenix came a serious [illegible] to leave the rocks. Men bent to the anchor windlass, trying to warp the vessel clear. She actually budged [illegible] yard won [illegible].

With new life the crew turned the windlass faster. A foot, a foot and so, [illegible] ahead, [illegible] new [illegible]. As we passed over the last reef of [illegible] came out.

The *Phoenix* Answers Mission Prayers

As usual, the Reverend Mr. Hannah was conducting Sunday evening service at Milingimbi. A native sat on the beach [illegible] with a bow, [illegible] for [illegible].

[illegible] the bay a light flickered and grew [illegible]. The native jumped to his feet and shouted something.

The congregation stopped singing in midhymn. At last, the ship has come in!

Half-[illegible] [illegible] [illegible] [illegible] [illegible] persuaded his flock back to [illegible] minutes more of worship.

Skill with Harpoon Provides a Feast for *Phoenix*'s Crew

[illegible] green sea turtle. The meat was cut into steaks and broiled over an open fire.

Most of Milingimbi had waited a long time for the *Phoenix*—nearly three months without tobacco. As for food, natives simply went hunting or fishing when stores dwindled.

To the missionary and his family, however, a ship meant mail, company, and something staple to eat. They never had enough of these, since supply boats called so rarely.

One morning began with a loud fight among the aborigines. A native named Marambuy had run off into the bush with another's wife. Interested relatives (the entire tribe) had brought [illegible]. The minister was at breakfast.

Marambuy's lawful wife screamed invective against him. Other natives closed in, shouting [illegible] by the culprit. When she tried to escape, Mrs. Marambuy left a nasty gash between her shoulder blades with a foot-long knife.

Minanga, brother-in-law of Marambuy, prepared to finish him off and avenge a jilted sister. The crowd took cover, for spears could ricochet like bullets.

Chess Time Interrupts at the Rabbit Farm on Arrham Land

[illegible]

Mr. [illegible] and Mrs. [illegible] [illegible]

[illegible]

Spear Eagle Nuisance to Humanity

[illegible]

Mr. [illegible] and Mrs. [illegible] [illegible]

[illegible]

Stone Age Cannibals and a 20th-century Legend of Mercy Travel in a Dugout Canoe

After the *Phoenix* ran aground, these mainland natives paddled 40 miles [illegible] to inquired crocodiles [illegible] 4250. There the missionary [illegible] Darwin and a flying boat was able to [illegible]

Like a summertime streetcar, the building had no sides. Like any church, it had a pulpit. Here Shepherdson stood, flanked by [illegible] clad, blue-shirted aborigine altar [illegible]. His stand before them held a Bible, hymnal and a pickle jar of white flowers. I took a seat [illegible]

Meanwhile [illegible] to their [illegible] from Lake Mo[illegible] chosen excellent [illegible] carried the Wesley [illegible] turn this area to [illegible] native version of the Lord's [illegible]

After the service [illegible] after church, Shepherdson-son issued rations for the midday meal. His wife, a graduate nurse [illegible] had received no patient.

I marveled at the aborigines' general [illegible] in their [illegible] country to infectious [illegible] wounds. Scarcely bothered by [illegible] of shiny flies from eyes [illegible] drank water I hesitated to wash in. The slightest [illegible] of my skin inevitably festered and [illegible] took weeks to heal. On a [illegible] however, even a deep cut mended quickly [illegible] of [illegible].

We walked up a slope to the Standard [illegible] House. From the veranda I looked over the

wide beach. Two natives were spearing fish for their lunch, while Mrs. Shepherdson prepared a walkaby for ours.

On the radio SSW called SYR: "Fred Mr Walker his photographic film got away by plane O.K. Nothing more for you, Sheppy. Nothing more for you, Sheppy. Cheerio, Cheerio. Over to you. Over to you.

Much of the time without radio or any communications, the Shepherdsons have lived nearly a quarter of a century in lonely Arnhem Land. After 15 years at Milingimbi they established a mission station on Elcho Island. Here they have stayed, even through the war when other stations moved to southern safety. Three hundred aborigines called them "father" and "mother."

In March, 1944, a prau with a tattered, calico sail beached on Elcho. Six Filipinos disembarked, almost too weak with hunger to drag themselves to the mission near by. The Shepherdsons took these men into their home and cared for them till they were well.

The Filipinos had been serving with a guerrilla outfit in Borneo. Disguised as native fishermen, they had escaped from the Japanese-occupied island and for three months had sailed enemy waters.

"Bundles of Congratulations"

Before [illegible] sion to Allied headquarters in Australia, the Shepherdsons' grateful guests wrote thankful notes. There is one:

U. S. Army Forces in Malaya
APO [illegible]
In the Field

14 March 44

SUBJECT: Thanks, Letter of
To : Mr. and Mrs. H. Shepherdson
LMS Mission, Elcho Island

1. I thank you from the deep bottom of my heart for the accommodations you have heartily extended me and party.

We felt at home in a white man's house and share the sheer hospitality. Life become grand and normal.

2. At this juncture allow me to extend my most profound thanks and bundles of congratulations.

[illegible]

Respectfully yours
(signature) Lampiete H. Ilteng,
Captain, U.S.A.F.M.
in the Field

"Exactly my sentiments," I told the Shepherdsons.

During a whole day the *Phoenix* discharges cargo for Elcho. To entertain our crew and to celebrate a hard job finished, the local natives held a *corroboree* (an original song and dance) that night.

At other corroborees I'd seen in the Northern Territory only men performed. On this occasion at Elcho women occupied the firelight. They danced to the singing of an old man, the bass moans of a long drone pipe, and the beating of sticks upon a teakettle.

Men, women, and children crowded around the stage, a 10-foot square on the sand. Here as many as seven half-naked dancers swished their skirts at once, or gave way to a dark prima donna. None of the numbers lasted more than a few minutes.

The technique seemed to consist of running hard in the same spot to keep time with the beating sticks. There was much waving of knees and hips, little of shoulders and arms; heads stayed bent toward the ground. At first the dancing puzzled me, then it enchanted. Finally I found it graceful, subtle, intriguing.

Journey Ends Abruptly

Two days after leaving Elcho Island the *Phoenix* reached Cape Wilberforce. It took another two days to navigate rip tides and head winds around the rock-ranged, precipitous point.

Once beyond this barrier, we picked up speed to hit our usual 4-knot stride. Under such momentum we traveled all night, sighted toward Melville Bay at dawn, rounded off northeastern Arnhem Land with breakfast and pulled up at Yirrkala too late for lunch.

There the fuzzy-haired but dignified Fijian missionary invited us into the house. His even fuzzier wife welcomed us graciously with tea and fruit cake. Both apologized for not preparing a regular meal. They had little flour, scarcely anything else. Embarrassingly the *Phoenix* unloaded less food at Yirrkala than anywhere else.

The Fijians' most gracious gesture came with our evening departure. They gave us two large fish speared within the hour to take aboard for supper.

Now down the final straightaway the *Phoenix* lumbered, past head-and-humped Fort Bradshaw with its aged Makin graves and skeletons, safely by Cahoon Bay and Isle Woodah where savage natives once speared a white constable.

After 34 days and nearly 700 miles, the *Phoenix* approached the north shore of Groote Eylandt. She entered Port Langton proudly, slowly maneuvered the channel into Little Lagoon, and then ran smack upon a sand bar and stuck.

Although five weeks late at her rendezvous the still fated *Phoenix* delivered the goods for the Arnhem Land expedition in 1948. And what, after all, did weeks mean in this timeless land of wait-a-while?

NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDING
SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON [illegible] C.

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

[illegible] magazine itself [illegible] expenditures [illegible]

[illegible] constantly being made. The Society has sponsored more than [illegible] years of field work [illegible]

The Society's notable [illegible] have pushed back the [illegible] United States [illegible] the [illegible] first [illegible] The Society [illegible]

In Mexico, The Society and the Smithsonian Institution [illegible] discovered the [illegible] which bears the [illegible] date [illegible] American [illegible]

[illegible] flight [illegible] Explorer [illegible] ascended [illegible] Capt. Albert W. [illegible]

[illegible]

The [illegible] Expedition [illegible] observations [illegible] the seventh expedition of The Society [illegible]

The [illegible] cooperated with [illegible] Washington [illegible]

[illegible] were [illegible]

The Society granted $25,000 and [illegible]

[illegible] were thereby saved [illegible]

One of the world's [illegible] by [illegible] Society and the Harvard [illegible]

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"A clear case of improving on perfection"

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* * *

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This amazing NEW invention will make you a better executive!

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1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible] 6. [illegible]

Your Name _____

Company _____

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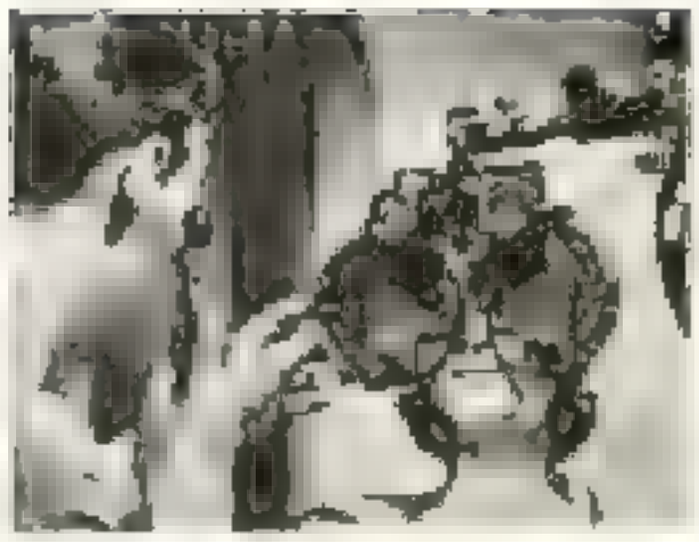
City & Zone _____ State _____

DICTAPHONE

ELECTRONIC DICTATION

[illegible]

EXAMINATION



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PRESCRIPTION

Examination . . . Refraction . . . Prescription
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For these services, and a lot more, is it worth $25 . . . $35 . . . $50 to help you see better?

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Your own special seeing problem.

The quality and style of glasses your prescription calls for.

When your vision fails to be all it should be, you'll need the aid of professional and technical services. Some of the services essential to good vision are illustrated. Helping you to see well involves much more than just a pair of glasses.

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American Optical

[illegible]

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FITTING

RE-EVALUATION

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[illegible] swimming pools (left) [illegible] sports decks (right)

Famous Rio landmark (below) — Sugar Loaf, rising 1,200 feet above the sea

The holiday you've waited for . . . a glorious ocean cruise to the wonders of *South America*

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[illegible] experiences . . . superb [illegible] cruise activities . . . [illegible] luxury [illegible] of Moore-McCormack Lines' Good Neighbor Fleet. Styled in the [illegible] modern manner, [illegible] Complete entertainment and recreation program aboard [illegible] every hour [illegible]

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YOU would expect an inventive farmer to come up with something practical, like a horse-drawn rake. And that's exactly what Thomas Stoddard of Fawlet, Vermont, did. The strange thing is that he also invented the steam calliope! He patented his musical monster in 1855 and a large number were installed on Mississippi steamboats. For several decades the waterways of America echoed to their strident music. Today, the calliope, which Joshua considered his masterpiece, survives only as a circus curiosity. But his horse-drawn rake is still blessed whenever men toil on the land.

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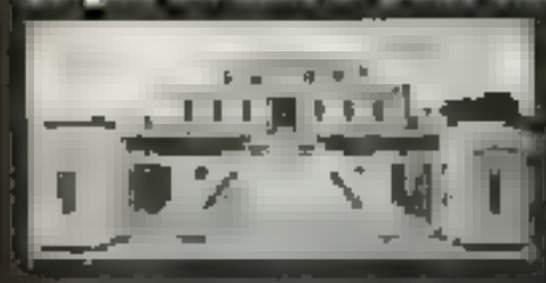

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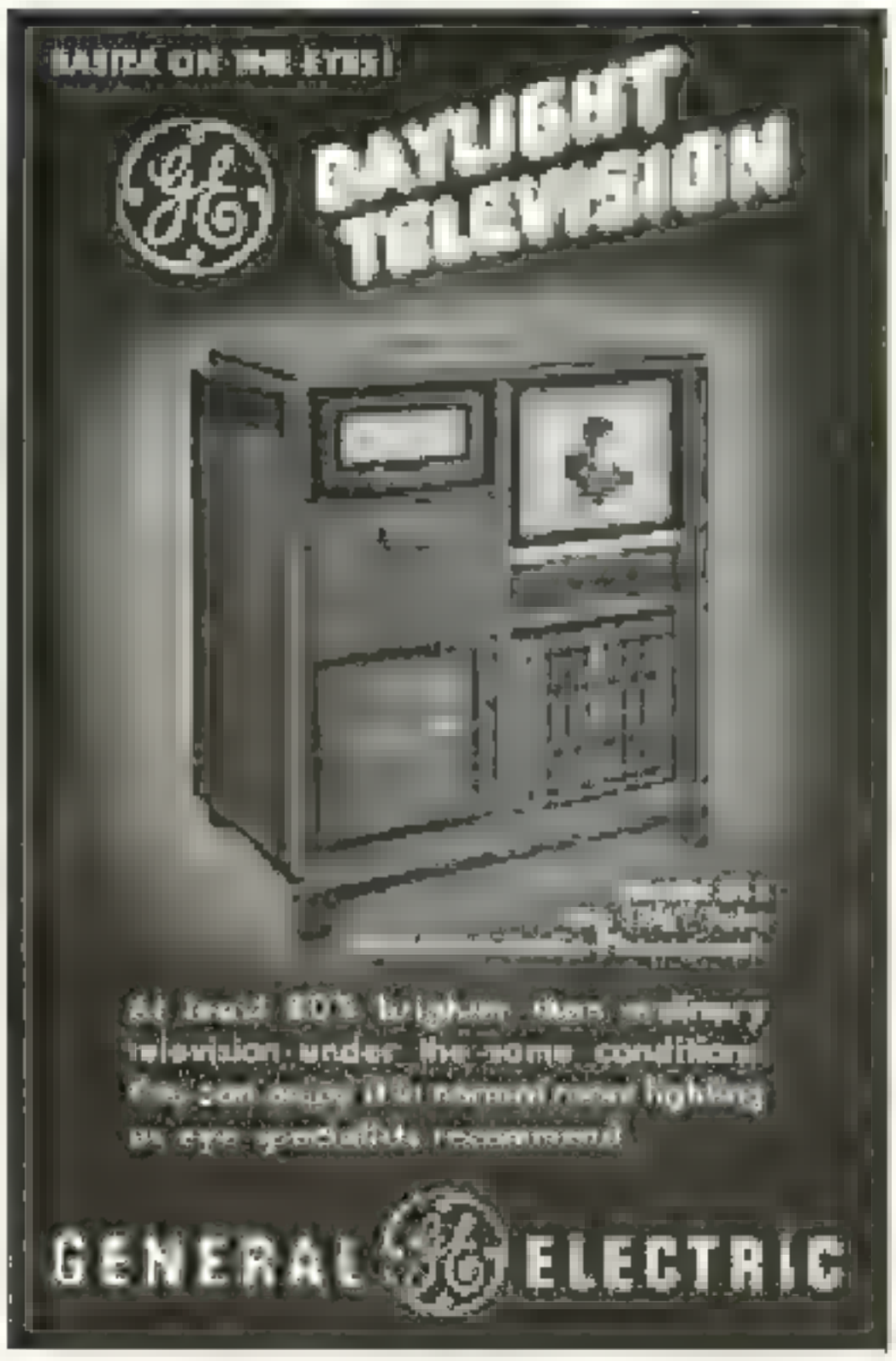
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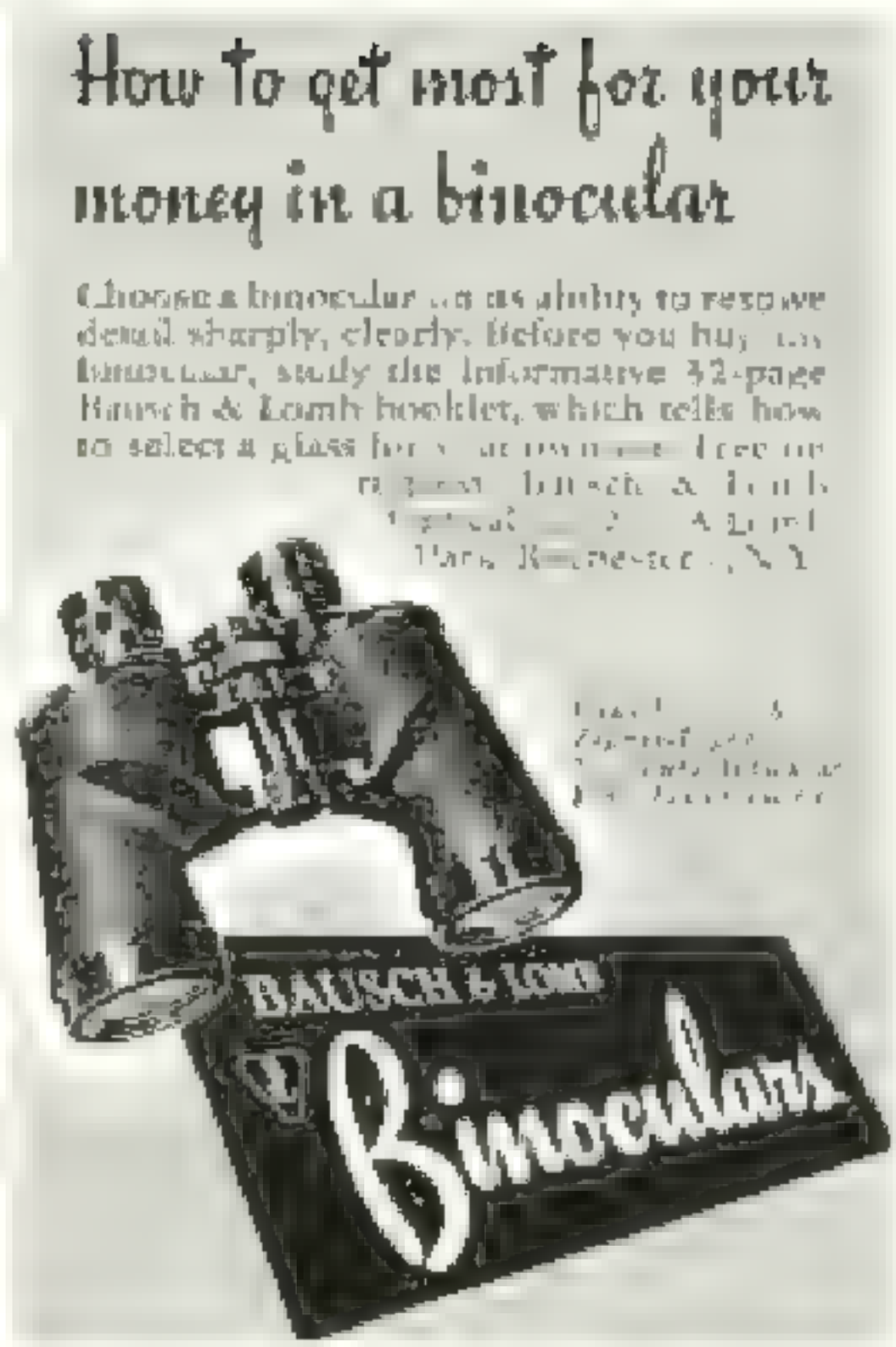
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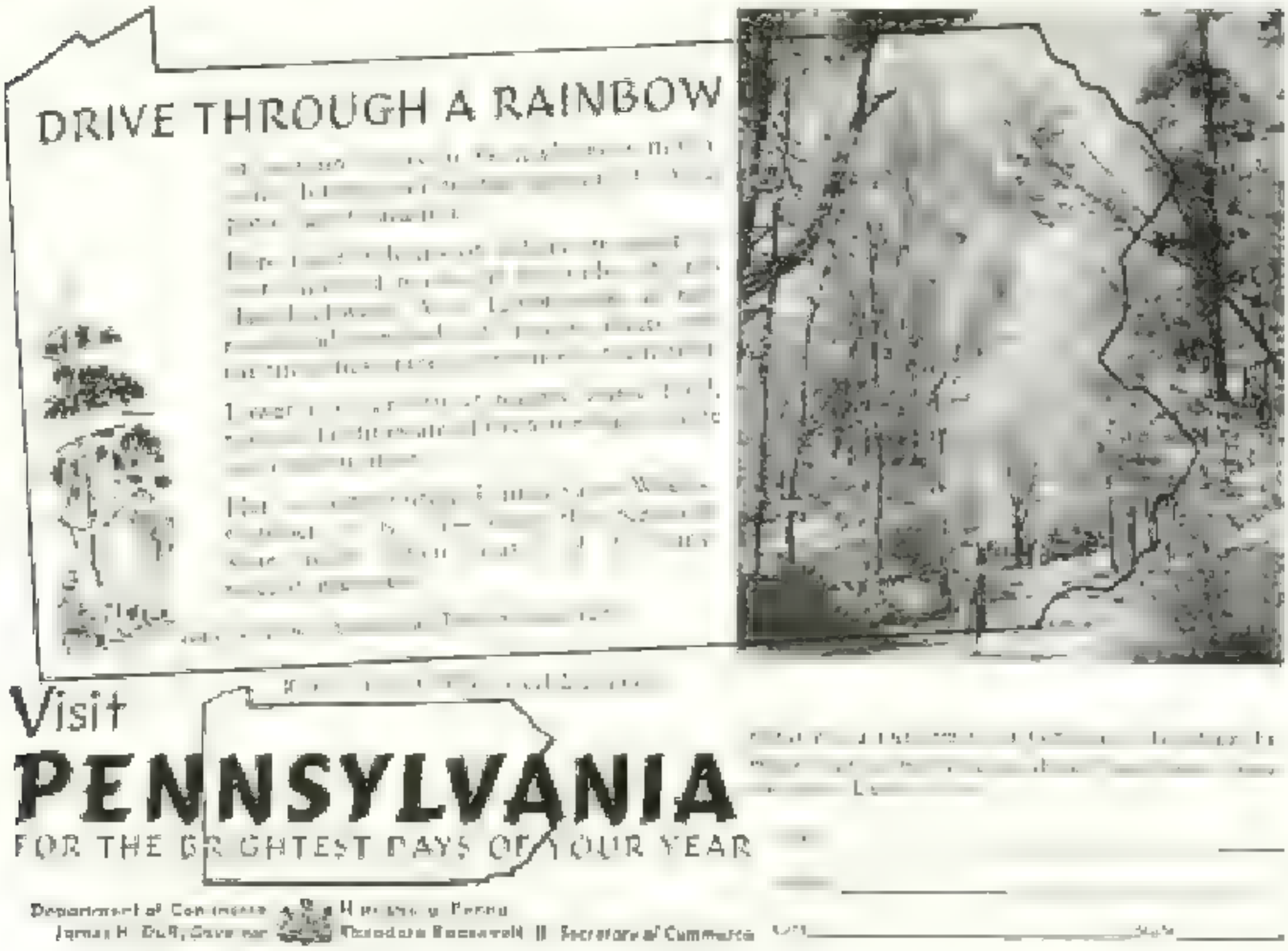
BAUSCH & LOMB
Binoculars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La Grange, Ill. • Home of the Diesel Locomotive

Enjoy September in VIRGINIA

[illegible] Virginia—in September! All over the grand old state, from [illegible] to the [illegible] seashore, all summer sports are still in full swing. The last flush of autumn has begun its color magic. Broad, modern highways and excellent rail, bus and airline service lead you [illegible] from fun spots to historic landmarks [illegible] wonder, [illegible] together [illegible] these places you've always wanted to see —

[illegible] wonderful place to visit. [illegible] to begin.

DEPARTMENT OF
CONSERVATION AND DEVELOPMENT
Room 638, 913 Capitol Street
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Enjoy [illegible] relax every day in sparkling sun[illegible] afame with [illegible] purple vista the [illegible] Tour by [illegible] Big game hunting. Plan your Pikes [illegible] new Mardi Gras

Colorado Springs
and MANITOU SPRINGS
at the foot of PIKES PEAK

[illegible]

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Double from $5

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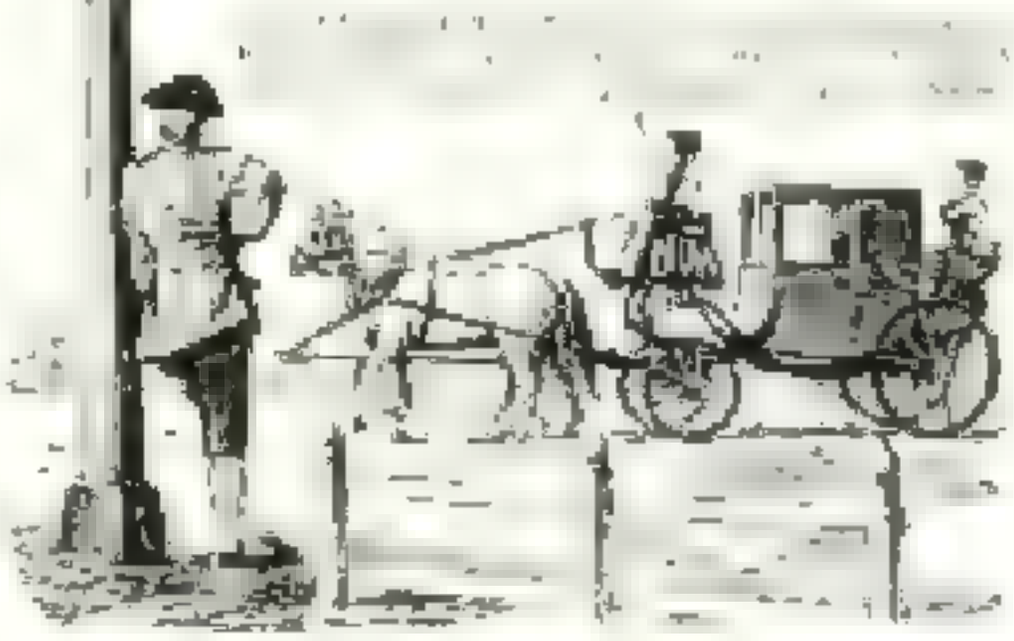


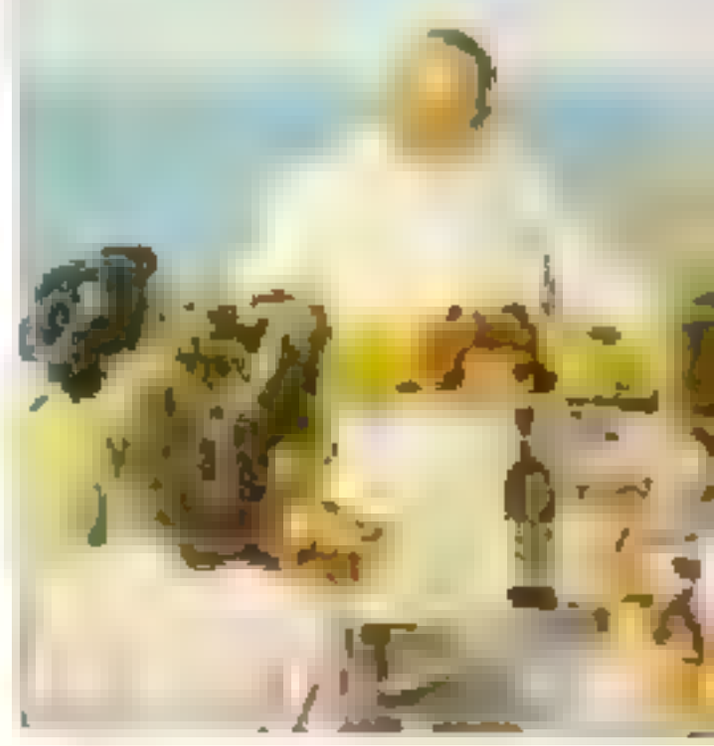

Brakes that whisper STOP

ITALY *is ready!*

SEE IT...ENJOY IT...TRAVEL AMERICAN EXPORT

Photos by Enzo Duilio — Frog women of Siena continue an ancient custom of Tuscany

Grotto
on the shores of Capri



"Fatherland of beauty . . . food for every taste, joy for every soul"

Italy is again in the light hearted land of hunger in the glorious mood of its newest renaissance in restoring famous places Americans most want to see. By all means go this year!

Visiting Italy is no longer a matter of seasons. In this lovely land there is so much for you to see and enjoy at all times that the word "season" has lost its meaning.

Why not go this Autumn and take advantage of a much wider choice of accommodations?

Choose one of the new "4 Aces" for your journey and relax in the air-conditioned comfort of these distinctive American vessels. They provide a new and pleasing experience in modern American living at sea—fortnightly from New York to Italy and the Mediterranean.

Also modern American liner LaGuardia in monthly service direct to Palermo, Naples and Genoa.

Your travel agent can aid you. Consult him or

Coming in the Fall of 1950—*the new [illegible] "Independence" and "Constitution" with the new "4 Aces" forming the only transatlantic fleet of completely air-conditioned passenger liners.*

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Compare picture quality —

Before you buy any television receiver, see Du Mont. See how good television can be. See what a clear, brilliant, steady picture you get on Du Mont's large, direct-view screen. Enjoy its rich, deep-throated tone. Then you will know the quality of performance you have a right to demand.

The Du Mont Success

DUMONT

Home of television is the cathode-ray picture tube. It was Dr. Allen B. Du Mont [illegible] device that made electronic television commercially practical. Du Mont [illegible] receiver; first with posttuner receivers; and operates the world's first television station. Du Mont [illegible] leading maker of telecasting equipment. The superb quality of your Du Mont [illegible] is the natural result of Du Mont's long experience in all phases of tele[illegible]—and only in television. Allen B. Du Mont Laboratories, Inc. [illegible] General Television Sales Offices and Station WABD, 515 Madison Avenue, New York [illegible] Passaic, New Jersey.

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IN A BRILLIANT NEW 16" TELEVISION COMBINATION

[illegible] MAGIC MIRROR TELEVISION [illegible]

TRIPLE PLAY PHONOGRAPH

[illegible]

DYNAMAGIC FM-AM RADIO

[illegible]

RCA Laboratories developed a copper mesh with 2,250,000 tiny openings to the square inch for the television camera.

You get ***finer television pictures*** *through this super-fine mesh*

In RCA Image Orthicon television cameras you will find a super-fine copper mesh. Until a new technique for making this type of screen was discovered at RCA Laboratories, only coarse and irregular mesh—which obstructed 60% of the picture—was available.

Today, through RCA research, such mesh can be made with 1500 gossamer wires to the linear inch. An ordinary pinhead will cover about 70,000 of its tiny openings.

By RCA's technique—now producing commercial quantities of 200- and 500-mesh screens—the mesh is so fine, so regular in structure, that it is invisible on home television receivers . . . and as much as 85% more television picture passes through.

You benefit—many times

This new type of super-fine wire mesh, like most major developments in all-electronic television, is another RCA Laboratories *first*. Leadership in science and engineering adds *extra beyond price* to any product or service of RCA and RCA Victor.

The newest developments in radio, television, and electronics may be seen in action at RCA Exhibition Hall, 30 West [illegible] Street, N. Y. Admission is free, and [illegible] are cordially invited. Radio Corporation of America, Radio City, N. Y. 20.

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Map Indexes: Available for maps [illegible] with an asterisk (*) in the [illegible] order blank [illegible] the case the location of names on [illegible] maps and describe the areas covered.

Map Case: This handy 7¾ x 10¾-inch folder, bound like a book, preserves maps for instant use. Ten pockets can hold 20 [illegible] maps [illegible] sizes [illegible] Special [illegible] features Canadian Provinces east of Maine.

Enlarged Maps

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United States—67" x 43½": [illegible] *4-color enlargement* of The Society's 1948 U. S. Map. This companion to the World Map listed below [illegible] shows main highways, national parks and monuments, large dams and the reservoirs they create, canals, elevations, 11,000 place names. Special insert features Canadian Provinces east of Maine.

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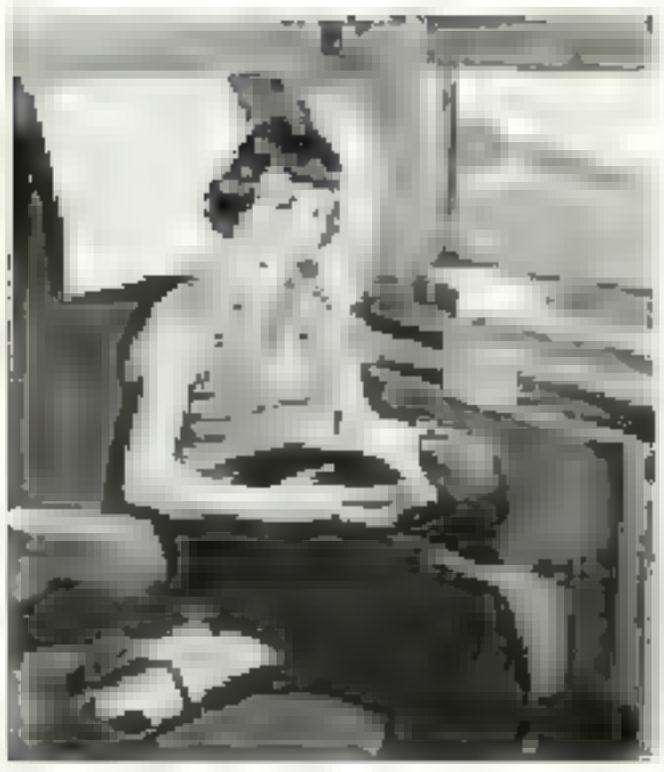
Prices: Please refer to coupon for separate prices in "U. S. & Poss." and "Elsewhere." Remittances should be payable in U. S. funds. All items sent postage [illegible]

Obtainable only from the NATIONAL GEOGRAPHIC SOCIETY, Dept. [illegible], Washington 6, D. C.

How to send 'em back to school... honored students!



She adds relaxation [illegible]

He's tempted to cram [illegible]

His roomy Pullman bed [illegible]

They all rate "A" for punctuality [illegible]

Visit the Chicago Railroad Fair in '49 [illegible] Stephens End. [illegible] the Pullman Exhibit

Go **Pullman**

THE SAFEST, MOST COMFORTABLE WAY TO GET THERE!

Detach this and send to the Secretary

Recommendation for Membership

IN THE

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** The Membership Dues, Which Are for the Calendar Year, Include Subscription to the National Geographic Magazine*

To the Secretary, National Geographic Society,
Sixteenth and M Streets Northwest, Washington 6, D. C. _____ 1949

I nominate _____

Occupation _____

(This information is important for the records)

Address _____

for membership in The Society.

Name of nominating member _____

Address _____

* [illegible] membership in United States, $4.00; Canada [illegible]; [illegible] Life Membership $100.00 [illegible] funds. Remittances should be payable to [illegible] United States and Canada should be made by New York [illegible]

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TO SELECT OR REPLACE... HERE'S ALL YOU DO

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An Esterbrook Fountain Pen

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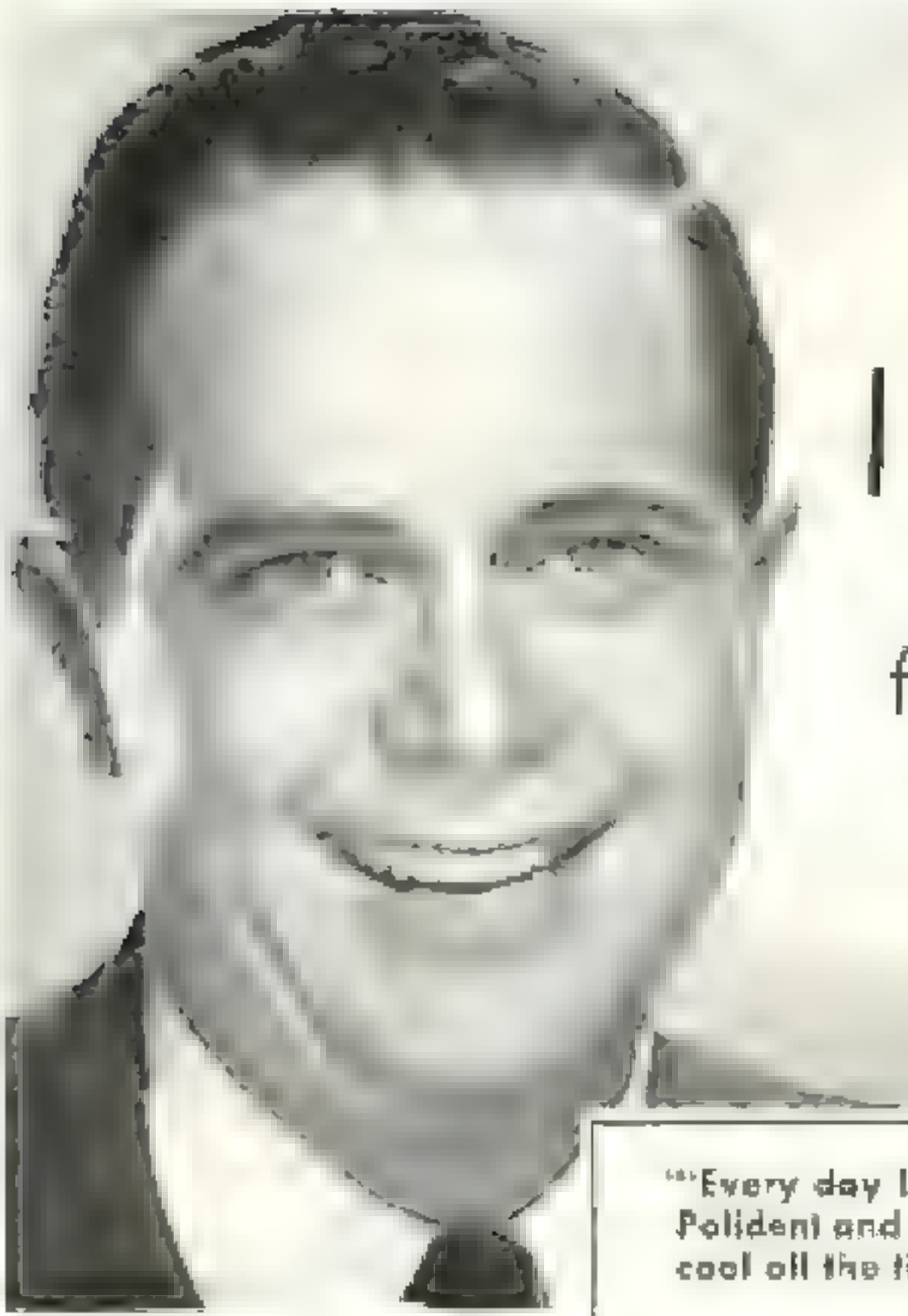
Matched pen and pencil set. Esterbrook Fountain Pen with a Esterbrook Push-Pencil. A point for every job. Lead as needed. Holds two feet of lead. Writes for months without reloading. Lead never wobbles, never jams. Push-Pencils $2 and up

Esterbrook
FOUNTAIN PEN



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yet my mouth feels fresh, clean and cool—thanks to Polident!®

"'Every day I soak my plates in a solution of Polident and water. My mouth feels clean and cool all the time . . . and no Denture Breath.'"

Mr. A. G. R., New Milford, Pa.

Soak plate or bridge daily—fifteen minutes or more—in a fresh, cleansing solution of Polident and water.

No Brushing

Y[illegible] know what Mr. R[illegible]—don't you! It's a wonderful feeling [illegible] friends wo[illegible]

[illegible] plates in Polident [illegible] And Polident [illegible] and revice—places brushing [illegible]

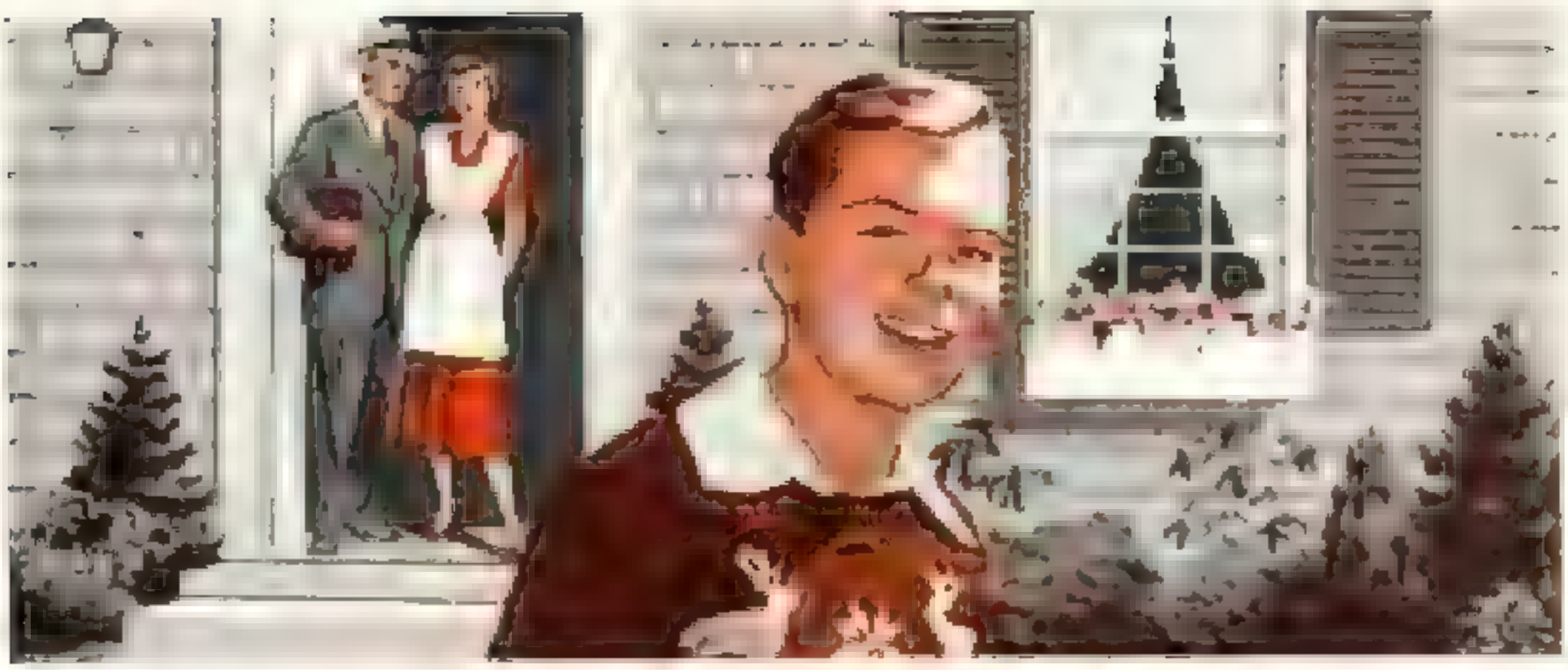
[illegible] dental plates of yours [illegible] So get a can of Polident tomorrow, sure.

POLIDENT

Recommended by more dentists than any other denture cleanser

Amazing New Cream Holds Tighter, Longer than anything you've ever tried or double your money back

POLI-GRIP



READY FOR SCHOOL?

Very real progress has been made in protecting the health of America's school-age children.

The present mortality rate for children, who are 5 to 14 years of age, is only about one fourth of what it was in 1900. For example, since that date, the death rate for measles, scarlet fever, whooping cough, and diphtheria [illegible] has been reduced about 90 per cent.

While these achievements are noteworthy, there is still much to be done in improving child health. As an illustration, [illegible] authorities have found that about one child in every [illegible] of those they have examined has poor hearing, one in every 8 has a defect in vision, while about [illegible] 10 have some tooth decay.

Such impairments often handicap a child at school and may lead to lower marks and maladjustment. As physical defects may go unnoticed by parents, it is wise for children to have thorough medical and dental examinations at [illegible] periods.

These examinations may help reveal conditions requiring corrective treatment, and may also provide information as to the child's general level of health. As a result, the doctor may make a [illegible] to help the child to keep in the best possible physical condition throughout the school year.

• • •

Children need [illegible] diet with [illegible] foods [illegible] strong bones.

Sufficient sleep is [illegible] children [illegible] 11 and 12 years, a child has about 12 hours sleep every night.

Regular exercise, [illegible]

As either underweight or [illegible] health, [illegible]

Only Wallace Sterling ... like sculpture ... is lovely from every angle

Only Wallace Sterling ... like Sculpture ... has

Third Dimension Beauty

WALLACE
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TOUCH DOWN

Exclusive Pneumatic Down-stroke Filler

No other pen can offer so much . . . no pen in the world can match it. Truly new—excitingly different—outstandingly better. Sheaffer's amazing Touchdown with its new, exclusive pneumatic filler is the first pen—the only pen that empties, refills completely at a single, lightly, finger-stroked Touchdown is the only pen that provides the ever hard-ground 14K gold point that gives you the ultimate in smooth-writing performance. And only Sheaffer's gives you the perfect blend of beauty and design that makes Touchdown the easiest pen to write with—the most beautiful pen to own. See Touchdown today at your Sheaffer dealer's.

W. A. Sheaffer Pen Company
Fort Madison, Iowa and Malton, Ontario, Can.

SHEAFFER'S

WHERE QUALITY IS A TRADITION

AMERICA'S *First* CHOICE*

(by actual sales records*)

Skrip makes any pen write better, last longer. Permanent or Washable. Exclusive top-well bottle makes pen filling quick, clean, easy!

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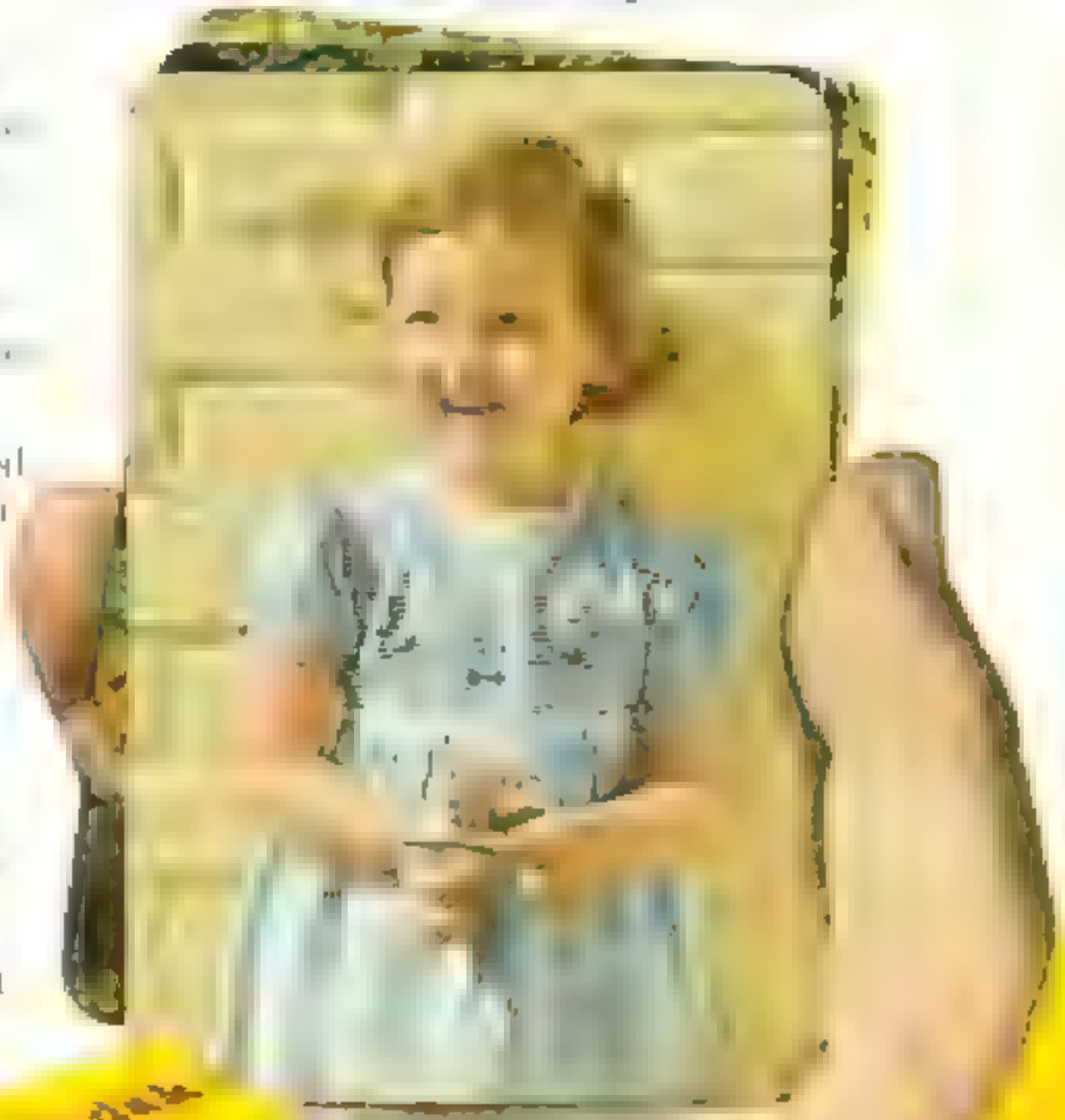

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